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AMATEUR RADIO

THE WIA RADIO AMATEUR'S JOURNAL

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Cover

Darcy Hancock VK5RJ celebrated his 80th birthday last December. Inset to photo of Darcy in his shack is the birthday cake baked for him in the shape of a transceiver, by his daughter in law Christina. See full story page 18.

Photographers: Shack XYL – Jean Hancock. Cake – Son Grant Hancock

EDITOR S COMMENT

BILL RICE VK3ABP EXECUTIVE EDITOR

Joint Publication?

We have received three letters recently, two in "Over to You" and one directly to the General Manager, suggesting that this magazine, *Amateur Radio*, should amalgamate with a commercial magazine such as *Amateur Radio Action*.

In this editorial, I would like to point out that there is not only a great deal of historical precedent for such amalgamation, but that similar proposals do arise from time to time and are always given careful and detailed consideration by Executive. Such topics are never "swept under the carpet without ... frank discussion" to quote one correspondent.

It is claimed by supporters of amalgamation that there would be several benefits likely from it.

First, that it would reduce the cost to the Institute of providing a magazine to members.

Second, that it would increase circulation, by being available to non-members.

Third, the greater circulation would make it more attractive to advertisers, further reducing costs, and fourth, that the standard of material published would be raised.

The most recently received letter even claimed that *AR* "fails miserably", that "little in it appears to be done well", and it is "not ... attracting adequate advertising".

To reply to these claims: Yes, it might reduce the cost, but at what cost? Read a little further. Increased circulation, maybe; but the main privilege of membership would disappear. Advertising has increased considerably over the last year or so. Just compare for yourself.

As regards our quality of articles, why are we often reprinted by *Radio Communication*, *Communication Quarterly* etc? Our "Fails miserably" critic would help us by telling us in what way we fail. But he failed miserably to tell us!

Earlier this year we published an excellent series of articles by Colin McKinnon VK2DYM, entitled "The History of the WIA Journal".

It was shown that *AR* as a magazine owned and controlled by the WIA did not come into being until 1933, and from 1919 until 1933 the Institute, itself divided by various rivalries and breakaways, was represented by a number of commercial magazines.

None retained "official journal" standard for more than four years, and the companies and titles involved sometimes changed with bewildering rapidity. This was no doubt aggravated by the build-up to the Great Depression, not totally different from today's conditions, with even 150-year-old newspapers disappearing at short notice!

Since 1933, *AR* has continued to serve its purpose regularly and reliably. World War 2 reduced it to a duplicated newsletter, but it has never missed a printed issue since October 1945.

Editorial, printing and publishing arrangements have altered many times over that 46 years, but "as is" the WIA has total control over what is published, the cost per page (adjusted for inflation) has never been lower, and the lead-time has never been shorter. I write this on 12 June. You will read it in 2½ weeks.

Let us all think long and carefully before we seek more (perhaps?) than we now have!

BR

WIA NEWS

FROM THE WIA EXECUTIVE OFFICE

Third Party Traffic Breakthrough!

For some years now negotiations between the WIA and DoTC on the topic of Third Party Traffic regulations have been bogged down by an inability to agree on a formal definition of "third party". The literal interpretation used by DoTC was at odds with that in use by most other countries which permit third party traffic by their licensed amateur radio operators (See WIANEWS item, May 1989). The WIA has long argued that the passing of a message from one amateur to another via a third amateur does not constitute third party traffic, preferring to reserve that term for use where the third person in the arrangement is a non amateur.

As announced as a "Stop Press" item in the June 1991 issue of Amateur Radio magazine, the WIA has at last received official approval and acceptance of our definition. A letter recently received from David Hunt, Manager Licensing, DoTC in Canberra includes the following:

In response to the WIA's submission, I am pleased to advise that the Department will no longer place a restrictive interpretation on the definition of Third Party Traffic by including licensed amateur within the definition. The Department accepts the responsible approach taken by the WIA in their representations on this subject and acknowledges the work of other Administrations in this area. Consequently, the Department agrees that a message originated by an amateur and passed to another amateur by a third amateur, whether within Australia or overseas, is not considered to be Third Party Traffic.

In other words, messages originated by one licensed amateur station and passed to other amateur stations by other amateur operators, will not be regarded as Third Party Traffic for the purposes of (International Radio Regulations) RR2733."

David then went on in his letter to explain that this change will be reflected in future brochures and licence conditions applying to the amateur service.

Victorian Division Office

There will be a minor change in the times the office is open for business.

The office is currently open from 9am to 4pm on Tuesday and Thursday.

As the major portion of the workload occurs before noon, the office will now open at 8.30am and close for business at 3.30pm.

Days of opening remain unchanged - Tuesday and Thursday.

WIA DIVISIONS

The WIA consists of seven autonomous State Divisions. Each member of the WIA is a member of a Division, usually their residential State or Territory, and each Division looks after amateur radio affairs within their State.

Division	Address	Officers			Weekly News Broadcasts	1991 Fees
VK1	ACT Division GPO Box 600 Canberra ACT 2601 Phone (06) 247 7006	President Secretary Treasurer	Christopher Davis Jan Burrell Ken Ray	VK1DO VK1BR VK1KEN	3.570 MHz 2m ch 6950 Rebroadcast Mondays 8pm 70cm ch 9525 2000 hrs Sun	(F) $67.50 (G) (S) $54.00 (X) $40.50
VK2	NSW Division 109 Wigram St Parramatta NSW (PO Box 1066 Parramatta) 2124 Phone (02) 689 2417 Fax (02) 633 1525	President Secretary Treasurer (Office hours	Roger Henley Bob Lloyd-Jones Bob Taylor Mon-Fri 1100 - 1400 Wed 1900 - 2100)	VK2ZIG VK2YEL VK2AOE	From VK2WI at 1045 and 1915 on Sunday, on the following frequencies: (MHz) 1.845 AM; 3.595 AM @ 1045 & SSB @ 1915; 10.125 SSB; 28.320 SSB & 1915; 10.125 SSB; 21.170 SSB; 28.320 SSB; 52.120 SSB; 52.525 FM; 144.120 SSB; 147.000 FM; 438.525 FM; 1281.75 FM 7.146 AM @ 1045 only. 584.750 (ATV Sound) 1281.75FM (R) Relays also conducted via many repeaters throughout NSW. News headlines by phone 02 552 5188.	(F) $65.00 (G) (S) $52.00 (X) $38.00
VK3	Victorian Division 38 Taylor St Ashburton Vic 3147 Phone (03) 885 9261	President Secretary Treasurer Office hours 0830-1530 Tue & Thur	Jim Linton Barry Wilton Rob Hailey	VK3PC VK3XV VK3XLZ	1.840 MHz AM, 3.615 SSB, 7.085 SSB, 147.250 FM(R) Mt Macedon, 147.225 FM(R) Mt Baw Baw 146.800 FM(R) Mildura, 438.075 FM(R) Mt St Leonard 1030 hrs on Sunday	(F) $69.00 (G) (S) $55.00 (X) $42.00
VK4	Queensland Division GPO Box 638 Brisbane Qld 4001 Phone (07) 284 9075	President Secretary Treasurer	John Aarsse Bob Lees Eric Fittock	VK4QA VK4ER VK4NEF	1.825, 3.605, 7.118, 10.135, 14.342, 18.132, 21.175, 24.970, 28.400, MHz 52.525 regional 2m repeaters and 1296.100 0900 hrs Sunday Repeated on 3.605 & 147.150 MHz, 1930 Monday	(F) $67.50 (G) (S) $54.00 (X) $40.50
VK5	South Australian Division 34 West Thebarton Rd Thebarton SA 5031 (GPO Box 1234 Adelaide SA 5001) Phone (08) 352 3428	President Secretary Treasurer	Rowland Bruce John McKellar Bill Wardrop	VK5OU VK5BJM VK5AWM	1820 kHz 3.550 MHz, 7.095, 14.175, 28.470, 53.100, 145.000, 147.000 FM(R) Adelaide, 146.700 FM(R) Mid North, 146.900 FM(R) South East, ATV Ch 34 579.00 Adelaide, ATV 444.250 Mid North Barossa Valley 146.825, 438.425 (NT)3.555, 146.500, 0900 hrs Sunday	(F) $67.50 (G) (S) $54.00 (X) $40.50
VK6	West Australian Division PO Box 10 West Perth WA 6872 Phone (09) 388 3888	President Secretary Treasurer	Cliff Bastin John Farman Bruce Hedland - Thomas	VK6LZ VK6AFA VK6OO	146.700 FM(R) Perth, at 0930 hrs Sunday, relayed on 3.560, 7.075, 14.115,14.175, 21.185, 28.345, 50.150, 438.525 MHz Country relays 3582, 147.350(R) Busselton 146.900(R) Mt William (Bunbury)147.225(R) 147.250 (R) Mt Saddleback 146.725(R) Albany 146.825(R) Mt Barker Broadcast repeated on 3.560 at 1930 hrs.	(F) $59.00 (G) (S) $47.50 (X) $32.00
VK7	Tasmanian Division 148 Derwent Ave Lindisfarne TAS 7015	President Secretary Treasurer	Tom Allen Ted Beard Peter King	VK7AL VK7EB VK7ZPK	146.700 MHz FM (VK7RHT) at 0930 hrs Sunday relayed on 147.000 (VK7RAA), 146.750 (VK7RNW), 3.570, 7.090, 14.130, 52.100, 144.100 (Hobart) Repeated Tues 3.590 at 1930 hrs	(F) $65.00 (G) (S) $52.00 (X) $38.00
VK8	(Northern Territory) is part of the VK5 Division and relays broadcasts from VK5 as shown (received on 14 or 28 MHz).					

Note: All times are local. All frequencies MHz.

Membership Grades
Full (F) Pension (G)
Needy (G) Student (S)
Non receipt of AR (X)

Three year membership available to (F) (G) (X) grades at fee x 3 times

This major breakthrough in Australian radio amateur regulations will be welcomed by all amateurs, but particularly those involved in packet radio communications.

Thanks are due by all Australian radio amateurs to David Hunt of DoTC for his help in resolving this long outstanding problem.

Amateur Morse Code Requirement

The question is often asked why do amateurs have to pass an examination in Morse code before they can operate on the bands below 30 MHz. Much comment has been seen in "letters to the editor" in the amateur press, and heard on-air, in recent times which indicates that many amateurs do not understand the situation.

Despite what many seem to think, it is not the WIA, or the DoTC, who insist that Morse Code be a requirement for the AOCP or the NAOCP. The answer is contained in the regulations that govern the amateur service.

There are two sets of regulations, one International and one National, that control the operation of the amateur service, including the conditions for qualifications for a transmitting licence. In fact, all telecommunications services, not just amateur, operate under similar conditions.

The international regulations are the Radio Regulations of the International Telecommunications Union (ITU). These Regulations are formulated by the member countries of the ITU, meeting as an Administrative Radio Conference. These Regulations are, in effect, a treaty between countries and have the same obligations.

The well known International Frequency Table is Article 8 of these Regulations, and Article 32 is the article setting out the international requirements of the Amateur Service and the Amateur Satellite Service. The applicable section of Article 32, RR2735 reads:

"Any person seeking a licence to operate the apparatus of an amateur station shall prove that he is able to send correctly by hand and to receive correctly by ear texts in Morse code signals. The administrations concerned may, however, waive this requirement in the case of stations making use exclusively of frequencies above 30 MHz."

These regulations can only be changed by an Administrative Radio Conference of the ITU.

An Administrative Radio Conference can only deal with matters which are on its agenda, which is set by the ITU usually some years before the actual conference. Any individual administration can propose items, but the item has to be approved by a majority of the member countries of the ITU before being included in the agenda. The Plenipotentiary Conference, which is held about every five years, may also have matters placed on the agenda.

WARC 79 had the whole of the ITU Radio Regulations on its agenda, and some small changes were made to Article 32 on the Amateur and Amateur Satellite Service.

Consideration of Article 32, however, is not on the agenda for WARC 92. The matters concerning the Amateur Service are all to do with the frequency table.

So much for the international regulations. National Regulations usually enlarge on the International Regulations, but should not conflict with them. Therefore, from this brief explanation, you can see that neither the WIA nor the DoTC is able to unilaterally ignore or modify the International Regulations relating to the Morse code requirement for Australian radio amateurs licensed to operate below 30 MHz.

Telecommunications and Saving Life

This year, World Telecommunication Day, celebrated internationally on May 17th, took as its theme "Telecommunications and the safety of human life". The United Nations General Assembly has also proclaimed the coming decade as Natural Disaster Prevention Decade.

In his message for the 1991 World Telecommunication Day, the ITU Secretary General, Pekka Tarjanne, emphasised the part that radio communications have played in increasing safety and saving lives since the first use of radio in the late 19th Century. From its initial development as an aid to mariners in distress, the safety net extended to land, air and now to space.

For effective disaster relief, telecommunications equipment may have to be moved rapidly across borders. The ITU is working with other bodies towards the possible development of an international convention to facilitate rapid movement and customs clearance for these situations.

Australian Radio Amateur Statistics

The DoTC statistics for the period to 31st March 1991 were received recently. According to these figures, the total number of individual licensed stations in Australia including beacons and repeaters is now 19,681, an increase of only 170 in the previous three months. Excluding beacons and repeaters, the number stands at 19,361.

However, with the help of new information from DoTC, a new procedure in the Executive Office now allows us to determine the total number of licensed operators as distinct from station licensees. This means that we can now quite accurately discount those operators who hold two or more station licences. This calculation indicates that there was a total of 17,566 licensed radio amateurs as at 31st March 1991.

It is of some concern to note that in the three months to 31st March 1991, the number of Novice licensees in Australia increased by only seven. Presumably a number of Novice operators up-graded, but where are all the new ones?

As an interesting comparison, a note in the ARRL newsletter for May 1991 lists the issue of new licences and upgrades in the USA for March 1991 as:

	New	Upgrade to
Novice	1,734	-
Technician	882	1,079
General	31	526
Advanced	5	371
Extra	4	240
Total	2,656	2,216

This indicates a much higher growth rate than in Australia, even allowing for the much larger population.

All Asian DX Contest

A note from the Japan Amateur Radio League, Inc., announces an alteration to the schedule of the All Asian DX Contest as follows:-

CW: The third Saturday of June (15th- 16th June 1991), from 00.00 (UTC) through 24.00 of the following day, instead of August.

Phone: The first Saturday of September (7th - 8th September), from 00.00 (UTC) through 24.00 of the following day, instead of the third Saturday of June.

Japanese Ham Fair '91

JARL News notes that the annual "Amateur Radio Festival" will be held this year on 23-25 August 1991. The program sounds as if a lot of effort has been made, with topics of interest to all groups as well as equipment displays and emphasis on youth participation. The same newsletter states that as a result of a membership drive for 5 weeks in November-December 1990, 1,104 new members were recruited to JARL.

Mariners Saved Despite Errors

We quote from the Newsletter of the Department of Transport and Communications:- *"From the Department's Quoin Ridge radio monitoring station in Tasmania comes the story of a boating party lucky to be alive. The boat owner had sent a distress signal using a two-*

way radio borrowed from another vessel. As a result, searchers initially looked for a 15 foot fibreglass half cabin cruiser when in fact the boat in distress was a 30 foot steel cruiser. To compound the situation, the radio was unlicensed, the distress signal was not transmitted properly and the boat owner did not hold an operating certificate. Despite these fundamental and potentially-tragic errors, the boating party was saved."

Special Achievement Award

The Dayton Hamvention 1991 Special Achievement Award was received by Nate Brighton, K6OSC, for his work over 12 years in restoring the original radio room on the "Queen Mary" now anchored at Long Beach, California. This restoration included the establishment of a complete amateur station which is now operational and open to the public.

Standards for Antennas

"The Australian Standard" for May 1991 notes release of a revision of the standards for "Receiving antennas for radio and television in the frequency range 30 MHz to 1 GHz". It specifies the electrical properties and performance parameters as well as methods of measuring these characteristics for antennas for domestic use.

1991 VK Novice Contest

A reminder that logs for the 1991 VK Novice contest should reach the Contest Manager by 26th July 1991. See your copy of June Amateur Radio magazine for the postal address.

Pay TV in Australia

The WIA recently received a promotional brochure for a rather up-market conference to be held in the Sheraton Wentworth hotel, Sydney. It is the third annual conference on Pay TV and it takes place over 18th and 19th June this year.

Whilst the WIA will not be directly represented, for the conference fee is over one thousand dollars, it is possible some amateurs associated with the TV industry may attend in their work capacity. If so, the WIA would appreciate a report on the conference.

The conference agenda is heavily slanted towards the industry and the impact pay TV will make upon it. Nevertheless a session is planned on legal, regulatory and licensing issues, although it is interesting to note the speakers do not include any Department of Transport and Communications officers. Indeed, they feature consultants and the director of the Communications Law Centre, an organisation not familiar to the WIA. In so commenting it must be observed the keynote speaker for the official opening address, name yet to be advised, will be putting the Federal Government's position. This will obviously be a paper worth getting.

What is of major concern to radio amateurs, where pay TV is involved, is the method of distribution of the services. We are all well aware of the EMC/RFI problems in the USA and elsewhere when cable TV is distributed at VHF carrier frequencies. Indeed, it has been difficult in the USA to have the amateur primary allocation at 144 MHz excluded from the cable channel allocations. We should take heart then, for this conference allocates time to consideration of the status of optical fibre technology and the presenter comes from Telecom, bringing an air of objectivity and strategic technology to the program.

The content of Pay TV is not a matter for WIA concern, however technical considerations which impinge upon our operating and enjoyment of the hobby are. Consequently, the WIA sees merit in Pay TV being distributed in digital format by optical fibre bearers. This digital approach has, we believe, considerable merit for the encryption of programs, the enhanced end to end signal quality and the ease of multiplexing a number of programs. Also the environmental impact of fibre optics cables is considerably less than bulky coaxial cables and only slightly more than MDS which would demand considerable SHF channels, some in an amateur secondary band!

IARU Region 3 Conference

The coming IARU Region 3 Association Conference is to be held in Bandung, Indonesia from 8th to 12th October this year.

The Conference agenda was published in WIANEWS in the April 1991 issue of Amateur Radio magazine. The Executive has now had time to consider in broad outline the WIA's likely involvement and provides the details for your information.

With a delegation of four representatives, funded from the WIA's international representation fund, the WIA will be able to be involved in working parties on bandplans, finance, packet radio, constitutional amendments and WARC 92. This is because these working parties usually meet concurrently.

The WIA can hold one proxy in our delegation. The WIA intends to advise its conference intentions as shown in this article to, and solicit a proxy from, one of the smaller Pacific amateur radio societies.

Executive will be asked in July to consider whether the WIA should submit an invitation to hold the 1994 IARU Region 3 Conference in Australia. The Gold Coast or an Eastern coast city are possibilities, but the WIA does not need to go firm on the location in the invitation.

On the matter of band plans the WIA will advise the current Australian amateur band plans. In particular the WIA is interested in how well the data segment on 20 metres is going. A letter has gone out to Divisions, technical committees and packet SYSOPS to seek these answers.

The Australian amateur involvement in WARC 92 planning will be advised. The immense value of David Wardlaw, VK3ADW's presence at the JIWP meeting in Geneva in March this year, as a member of the Australian delegation, will be highlighted.

The WIA will report changes in management of the radio spectrum in Australia such as the Bureau of Transport and Communications Economics report on valuing the spectrum, the joint Houses of Parliament inquiries into spectrum management and the release of the Australian Spectrum Plan in 1990.

The funding of IARU activities is an issue which has caused the WIA some concern in recent times as it became aware the Region 3 Association has run well over budget in this triennium.

The WIA is producing a short paper describing the Standards Australia and AUSTEL involvement in setting national standards. The RF Tag Devices debate the WIA had with DoTC last year will be used as an example of the need for international coordination of standards.

Our amateur satellite coordinator, Graham Ratcliff VK5AGR, will be contributing a paper on amateur satellite usage and funding satellite development. Wally Watkins VK4DO, has sent in a paper on the development of amateur radio in emerging nations, centred upon his experiences with visits to China as an amateur radio instructor. The WIA has also asked the Gladesville ARC if they can suggest means whereby other nations might utilise their instructional video tapes.

The WIA will advise the conference on recent changes relating to the allocation of callsigns to visiting amateurs. Whilst the situation is not exactly what prevails overseas, which was our desire, it is an acceptable compromise.

Intruder Watch comes in

for considerable debate at these international conferences. The WIA wishes to make the point, delicately, but as forcefully as possible, that many of the 10 metre intruders appear to be in countries to our north. The proliferation of 10 metre transceivers, not only there but also in this country, has not helped the problem. Indeed the WIA must soon reconsider the matter of *"no transmitter sales without an appropriate licence"*.

At the last Conference delegates were very strong on converting the 10 metre beacon system to occupy a much narrower beacon band segment and be time sharing like the 20 metre system. Since then the need to occupy amateur bands has taken on more significance and a compromise solution may be the way ahead. No Australian beacons have changed, ostensibly because of the difficulty in constructing an accurate clock sequencer to control them. Resorting to the past system and band plan may not be the best option, for the beacon segment is in the Australian novice segment; nevertheless some compromise should be possible which continues to populate part of the band and stake the amateurs' claim in the face of CB, pirate and commercial pressures.

Amateur radio direction finding is an expanding facet of amateur radio in emerging countries. It is like foxhunting on foot combined with orienteering. Australia is not strong on this activity, however Wally Watkins and the Townsville ARC are involved in such a contest in China next August.

Our unique and constraining third party traffic definition, which was of interest, and concern, to regional amateurs at the last conference, is no more. Recent negotiations with DoTC have put in place conditions identical to those prevailing in England, USA and New Zealand. Of course bi-lateral agreements are still required for general (ie non-amateur) traffic handling with overseas countries.

The WIA intends to inform the Conference of its recent decisions on the handling of QSL cards. That is, an essentially free service for members and handling on a cost recovery basis for non members. The WIA will strongly emphasise that it accepts inwards cards in keeping with IARU rules.

Packet radio is a topic which creates considerable interest at conferences like this one. The WIA is working towards a SYSOPS "Code of Ethics" or guidelines and hopes to present a first agreed version to the Conference. The WIA observes that other national societies are formulating such guidelines, being aware of an RSGB example and a recent JARL production. In all cases the aim is to guide and advise, rather than regulate, to protect packeteers from the strong arm of national authorities. Packet frequencies and third party traffic considerations are considered elsewhere on the agenda.

The WIA has been very concerned of late with the apparently poor budget management of the Region 3 Association leading to financial difficulties and a call upon regional societies for supplementary funding by way of donations. The WIA responded in 1990 with a donation of $US1000. It is the WIA's intention to ensure a reasonable and sensible budget is struck and adhered to. The formula for determining subscriptions needs alteration to balance the larger societies contributions, at the same time noting JARL contributes in kind which is not brought to account and ORARI would find it difficult to accept overly large increases.

There are constitutional changes the WIA would wish to see made to the Association's articles. The WIA believes the Association is now mature and needs its office bearers regularised by the creation of a President to replace the current chairman of directors arrangement. There is also a need to designate an official as treasurer, as the sorry financial situation has demonstrated the difficulties where the secretary has double duties. There may also be merit in setting limits to the duration directors and other officers hold office without a break period. The WIA believes three trienniums are enough, with perhaps the ability for the conference in plenary to extend a further triennium by special resolution. The WIA wishes to retain the good workers, yet achieve a turnover without offence to any one.

The Regulations of the Association are in need of revision as to the method of conduct of conferences. With meetings only once every three years, and at some expense to all involved, it is essential maximum benefit be obtained on all fronts. The WIA believes a Conference chaired by the Chairman of Directors (or, as the WIA intends to propose, the President) with his Association secretary in support, is the most business-like way of progressing the Conference.

Not withstanding the business paper, the Conference has great local prestige value in addition to its social contact value. To host the Conference is a way of applying subtle pressure upon a national administration and maximum mileage must be made of this facet. By appointing the host societies' president as the Conference President this objective can be exploited to the full without detracting from the Conference business. Furthermore, the workload is aptly shared by two appropriate amateurs of suitable stature.

The election of office bearers brings the WIA to the point of *"putting its money where its mouth is"*. The chairman of directors, David Rankin 9V1RH/VK3QV, is a very capable director, however he has held office for several trienniums and is deserving of a break. A compromise is to re-elect him for one more triennium as President on the clear understanding the position must rotate in 1994. The Australian resident Director, David Wardlaw VK3ADW, has completed one triennium and will be re-nominated by the WIA.

The WIA has given consideration to nominating an Australian for the secretary position. However, the current financial state of the Association, the contributions in kind by JARL (which would be very difficult to realise in hard currency) and the financial burden the office would make upon the WIA all suggest the WIA defers that action.

VNG Update

The latest VNG news received from Marion Leiba VK1VNG/VK1BNG, reads:

"On 28 May 1991, Australia's standard frequency and time signal service, VNG, was issued a licence to operate on 8.638 MHZ. Like 12.984 MHz, 8.638 MHz is on loan from the Royal Australian Navy and we are again very grateful. It must be remembered, however, that the Navy reserves the right to take back these frequencies at any time should they need them.

These new transmissions will both be double sideband at 10 kW power, but with the bandwidth restricted to 3 kHz at the Navy's request. Also, because of the international spectrum allocations, VNG is not permitted to transmit voice on either frequency. Instead, the letters 'VNG' will be transmitted in slow Morse, possibly three times a minute with a frequency of 750 Hz. For those who don't know Morse, VNG is '...- -. --.'

The frequency synthesisers for 8.638 and 12.984 MHz are being built in the Geology Department of the University of Tasmania, located in Hobart, by Vagn Jensen. Vagn also designed the synthesisers and construction is almost complete.

The staff at the VNG site at Llandilo are going to shuffle aerials and transmitters. The present VNG standby transmitter will be used for 16 MHz with yet-to-be-constructed

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Modulation Systems & Modes of *Transmission*

A Discussion on Their Merits

Lloyd Butler VK5BR 18 Ottawa Ave, Panorama 5041

Introduction

OVER THE YEARS, we have phased out straight amplitude modulation on the HF bands and replaced it with single sideband. On VHF we give preference to frequency modulation. What are the merits of these various systems and why do we choose one in preference to the other? We might expect the answers to these questions to be well understood by the seasoned amateur radio operator, but perhaps not so well understood by our less experienced or novice operator. This article is essentially written for the latter, but a little bit of revision concerning some of the principles might not go astray for all of us.

In the paragraphs which follow we discuss the fundamental differences between the various modulation forms and compare them with reference to such characteristics as bandwidth, noise immunity and transmitter efficiency. Initial discussion involves the various forms of modulation in relation to speech transmission, and this is followed by their application in encoded modes of transmission such as hand-sent Morse, machine telegraphy and other digital systems. A brief reference is also made to their application in television.

Amplitude Modulation

In amplitude modulation (AM) the amplitude of the radio frequency (RF) carrier wave is varied as a function of the instantaneous voltage of the modulating signal. When the modulating signal goes positive, the carrier wave amplitude is increased. When the modulating signal goes negative, the carrier wave amplitude is decreased. The degree of modulation is expressed as a percentage of maximum modulation possible without distortion of the signal information. Figure 1 shows the carrier wave modulated 100 per cent by a sine wave modulation signal. The carrier wave amplitude is doubled by the most positive going excursion of the modulating signal and the amplitude is reduced to zero by the most negative going excursion of the modulating signal.

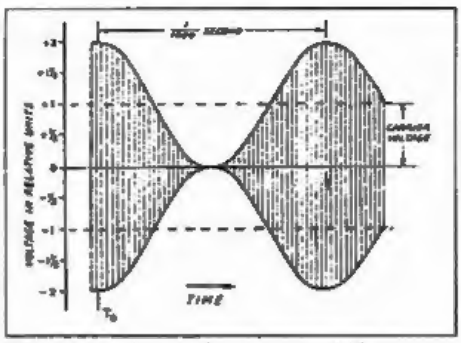

Fig 1. Envelope of carrier 100% modulated by a 1000 Hz sine wave.

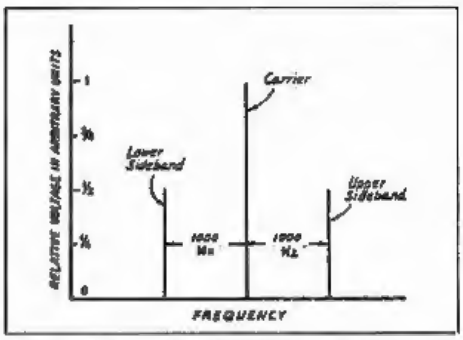

Fig 2 – Example of 100% modulation of a carrier by a single tone of 1000 Hz.

The waveform shown in figure 1 is a plot of carrier amplitude on the Y axis as a function of time on the X axis, and this is often defined as being plotted in the time domain. If we plot the amplitude on the Y axis as a function of frequency on the X axis, often defined as being in the frequency domain, we get a different picture. Figure 2 shows, in the frequency domain, a 1MHz carrier frequency modulated 100 per cent by a 1000Hz sine wave modulating signal. The carrier frequency at the centre is the same amplitude as if it were unmodulated. However, there are two side frequencies created, one equal in frequency to the carrier frequency plus the modulating frequency, and one equal in frequency to the carrier frequency minus the modulating frequency. The amplitude of each of the two side frequencies is half that of the carrier frequency.

Since power is proportional to the square of voltage, the proportion of power in each side frequency is equal to 0.5

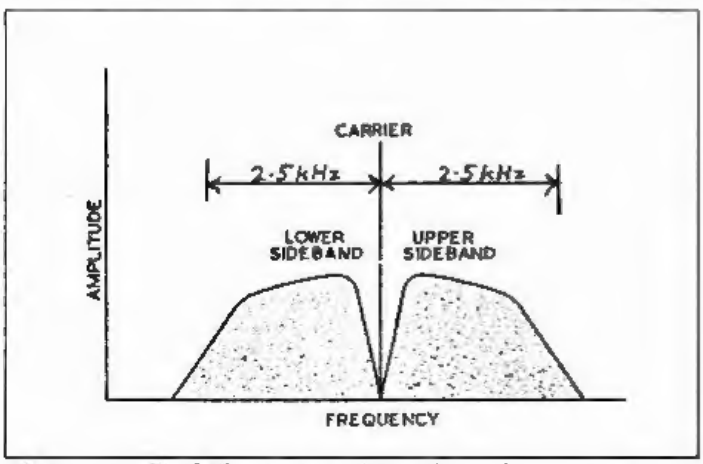

Fig 3 — Amplitude/frequency relationships of carrier and sidebands with 100% speech modulation.

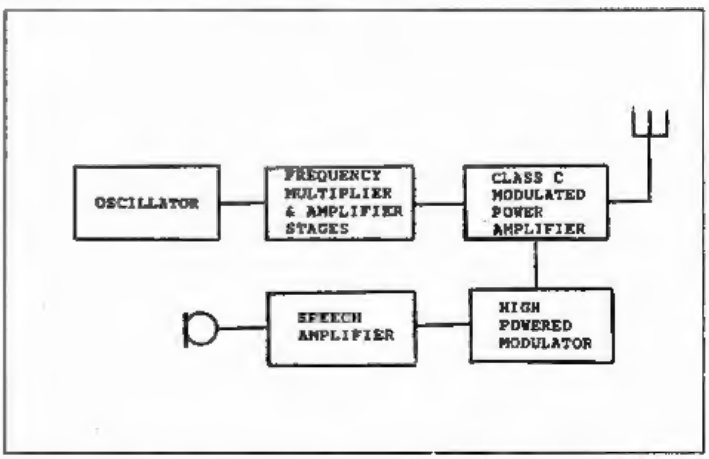

Fig 4 — High level (plate modulated) amplitude modulation transmitter.

squared or a quarter of that in the carrier. If the carrier is modulated 100 per cent by a complex waveform of many frequencies, two sidebands of frequencies are created, each with power equal to a quarter of the carrier power. The significance of all this is shown by considering a carrier of 100 watts modulated 100 per cent. Additional power of 25 watts in each sideband is also transmitted, making a total power of 150 watts. The intelligence transmitted in the complete modulated signal is contained in the sidebands and only one of these is needed to support this intelligence. Here we see a reason why single sideband (SSB) transmission is used in preference to transmitting the basic AM; 25 watts of SSB is just as effective as 150 watts of AM carrier plus sidebands.

A further consideration is the bandwidth taken up by the amplitude modulated signal. To transmit good quality speech, audio frequencies in the range of around 200Hz to 2500Hz must modulate the carrier. Hence the sidebands extend from 2500Hz below the carrier frequency to 2500Hz above, requiring a complete bandwidth of 5000Hz (refer figure 3). If one sideband and the carrier are suppressed, as in the SSB system, bandwidth is reduced to 2300Hz, less than half that of the AM signal. This means that the receiver bandwidth can be halved and more signals can be fitted in a given bandspace to be received without interference. Suppression of continuous transmitted carrier on adjacent signals also results in improved reception as heterodyne whistles are eliminated. These whistles are often a problem on a crowded band of AM signals.

The AM Transmitter

In replacing the AM system with the SSB system, some significant savings are achieved in the size of the RF power amplifier and in the power supply which feeds the amplifier. Let us consider an AM transmitter which is to deliver 100 watts of carrier power. High level or plate modulation (as shown in figure 4) is to be used, and, in this system, our final RF power amplifier can run at the highest possible efficiency in Class C operation. In this form of operation, the output tuned circuit (called a tank circuit) is pumped to maintain it in oscillation by pulses from the RF power amplifier. The amplifier is biased to allow only a small portion of the RF drive sine waveform to be amplified, so providing the pumping pulse. In this form of operation (Class C), the amplifier can be made to operate much more efficiently than as a linear amplifier which must reproduce the complete sine wave fed into it. Efficiencies in the order of 70 to 80 per cent can be expected from a Class C amplifier, and for our transmitter we will assume a value of 75 per cent. Our total input power to the transmitter is therefore 133 watts of which 100 watts is radiated and 33 watts is dissipated in the amplifier in heat. To supply the amplifier, we need a power supply which can deliver a power of 133 watts and we need an amplifier valve (or perhaps a transistor) which can dissipate a continuous power of 33 watts.

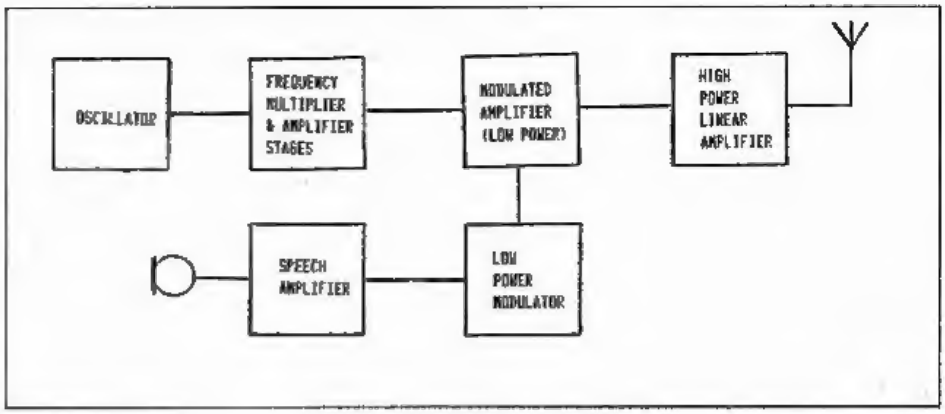

Fig 5 — Low level amplitude modulation transmitter.

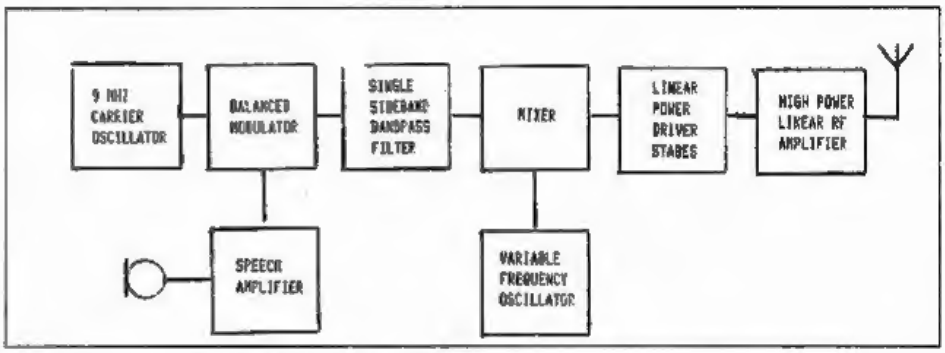

Fig 6 — Typical single sideband transmitter.

To 100 per cent modulate our transmitter, we also require 50 per cent of extra power for the sidebands, and this is 50 per cent of the input power 133 watts, not the 100 watts of output power. The extra power is supplied as 67 watts of audio from the modulator output stage. The modulator stage runs as a high efficiency power amplifier in Class AB or Class B and a practical efficiency might be as high as 60 per cent which we will assume. At 100 per cent modulation continuous tone, DC load on the modulator power supply is 112 watts and the modulator valves or transistors must dissipate 45 watts. The output power on speech is only about 20 per cent of the peak power which gives 100 per cent modulation. However, the average DC power is somewhat higher than this because of the zero signal standing current into the amplifier. In Class AB, the power input at zero signal might be in the order of one quarter to one third of the input power at peak output, and for our case, around 28 to 37 watts. All in all, the modulator amplifier must dissipate an average power of around 30 to 40 watts, and the modulator power supply must be able to supply a varying load which swings between say 30 to 112 watts.

To summarise this, our 100W AM transmitter requires the following:

RF power amplifier — 33 watts continuous dissipation

Modulators — Average dissipation 30 to 40 watts

RF amp power supply — 133 watts continuous

Modulator power supply — Swinging load 30 to 112 watts

As an alternative, we could use low-level modulation to eliminate the high power modulator and its power supply. Either grid modulation is used or a RF driver stage is modulated and followed up with a linear RF final power amplifier as shown in figure 5. In either case, the final amplifier, being a linear stage, must be operated at a much lower efficiency than in class C. Hence, higher dissipation amplifiers are needed and a larger power supply. What is gained in reduced modulator power is lost in extra dissipation power in the final RF amplifier.

The SSB Transmitter

A typical single sideband transmitter is shown in figure 6. The SSB signal is generated in the low-level stages of the transmitter. A balanced modulator is used to balance out the fixed carrier of 9MHz, leaving a double sideband suppressed carrier signal. This is fed through a fixed frequency narrow band filter designed to slice off one of the two sidebands. The remaining sideband is mixed with a variable frequency oscillator (VFO) to produce the SSB signal at the required operational frequency. All stages following the modulator (including the final RF power amplifier) must be operated in a linear mode. Since the final amplifier is linear, it cannot be operated in Class C, and its power efficiency is lower than that obtainable in a high level modulated AM transmitter. Before considering this to be a disadvantage, we must first examine actual powers involved.

It was pointed out earlier that 25 watts of single sideband was equally effective as a 100W carrier AM signal fully modulated. To make comparison with our AM transmitter, we use 25 watts of SSB. Our final linear RF amplifier in, say Class AB, might be expected to have a typical efficiency of 50 per cent. At this percentage, input power is 50 watts and hence our power supply must deliver 50 watts and our amplifier must dissipate 25 watts. This is a large improvement on the 133 watts of input power and 33 watts of dissipation quoted for our AM transmitter, but our gain is even better than this. The 50 watts input to the SSB amplifier on speech is our peak envelope power (PEP). As we discussed earlier, the average power into a Class AB amplifier on speech is much less than this and possibly in the region of 30 per cent of the peak value. Taking this percentage, the average input power is only 15 watts, with the average dissipation perhaps half of the 15 watts. (The average dissipation will depend much on what standing current is run in the no-signal condition between speech syllables).

Now to summarise the SSB transmitter:

RF power amplifier — 7.5 watts average dissipation

RF amp power supply — Average power load 15 watts with regulation to allow for short duration peaks of 50 watts.

High power modulator not required.

Comparing this to the AM transmitter, previously described, we see that SSB offers a considerable reduction in the ratings and size of components used in the final stages of the transmitter. Even though the SSB circuitry is a little more complicated, the SSB transmitter can be made more compact than the AM unit of equal effective power.

Frequency Modulation

In frequency modulation (FM), the frequency of the carrier wave is varied as a function of the instantaneous voltage of the modulating signal. This is illustrated in figure 7. The amount of frequency shift off the centre frequency is called the frequency deviation. A peak deviation of 5kHz (such as used in amateur radio systems) means that the carrier frequency is shifted in one direction a maximum of 5kHz by the positive going peaks of the modulating signal and shifted in the opposite direction a maximum of 5kHz by the negative going peaks of the modulating signal. Total frequency swing is thus 10kHz.

Modulation index is defined as the ratio of frequency deviation to modulating frequency producing the deviation. If a 1kHz modulating signal produces 5kHz of deviation, the modulation index is equal to 5. Considering a maximum speech frequency of 2.5kHz, the modulation index equals 2 if the carrier frequency is driven to a maximum deviation of 5kHz by that particular speech frequency component.

The FM receiver is designed to be insensitive to amplitude variation in the RF signal it receives. As random incoming noise is received essentially as a voltage of fluctuating amplitude, the receiver on FM has a signal to noise ratio advantage over an AM receiver, given received signals of equal carrier amplitude. The degree of that advantage is dependent on the modulation index which is used and this is illustrated in figure 8 showing noise reduction factor in dB as a function of the index. The diagram shows that to gain advantage, the modulation index must be greater than 0.6, and the higher the value of the index, the greater is the noise reduction factor. In comparing the FM and AM systems, equal receiver audio bandwidth is assumed.

All this is fine except that the FM signal has sidebands much more complicated than the AM signal, and which theoretically extend infinitely either side of the carrier frequency. In practice, we need only to consider the sideband frequencies which are of significant level. The bandwidth of the significant sidebands increases both as the modulation index is increased and as the modulating frequency is increased. The second curve in figure 8 plots the bandwidth of the significant sidebands as a function of modulation index for a modulating frequency of 2.5kHz, chosen as the maximum speech frequency. Using both curves, we see that to get a 10dB signal to noise ratio advantage we need a modulation index equal to 2. However, to achieve this, we take up a bandwidth of around 22kHz.

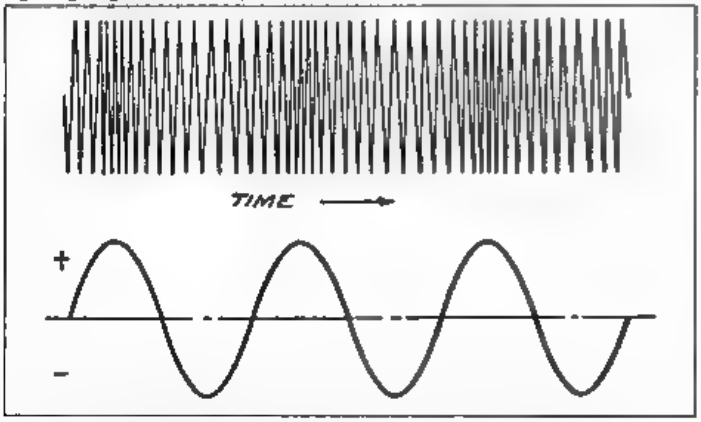

Fig 7 — A frequency-modulated signal in which the frequency of the signal varies in accordance with the level of the modulating audio voltage. At points where the audio voltage is positive, the frequency is high, while at points where the audio voltage is negative, the frequency is low.

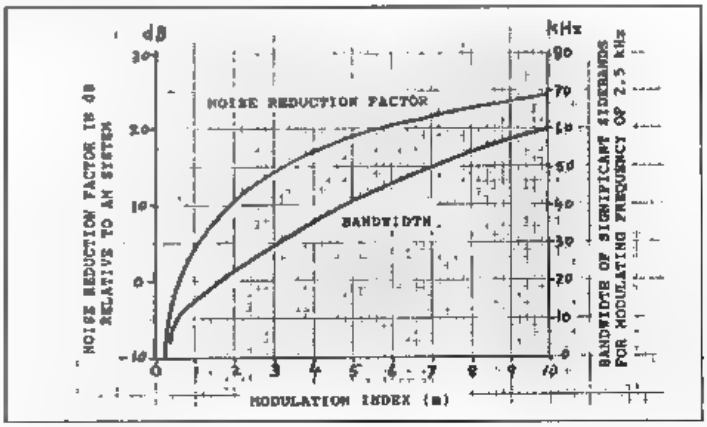

Fig 8 Comparison of bandwidth and noise reduction factor in FM system for different values of modulation index at a modulating frequency of 2.5kHz.

So here is the answer to why FM is restricted essentially to the VHF and UHF bands. FM gives us a signal to noise ratio advantage over AM, but it takes up more bandwidth and much more than we are able to accommodate in the restricted bandspace of our HF bands. More bandspace is available on the VHF and UHF bands, allowing us to use FM as a popular mode of transmission. On two metres, for example, we use 25kHz channel spacing to accommodate the wide bandwidth FM signals.

Frequency modulation is actually allowed on the HF bands, but bandwidth is restricted to 6kHz, limiting the modulation index to around 0.4 at 2.5kHz modulating frequency. With this restriction, performance cannot be expected to be any better than AM, and not as good as SSB

The FM Transmitter

As in the SSB transmitter, modulation of the FM signal is carried out in the low level stages of the transmitter (refer figure 9). However, unlike the SSB transmitter, linear amplification is not required following modulation and the following stages (including the final amplifier) can be run at highest efficiency in Class C operation. The final amplifier efficiency is thus similar to that of an AM transmitter using high level modulation. Of course, a high power modulator is not required as in the AM transmitter so that the high power circuits in the FM transmitter are less complicated than for the AM transmitter of similar carrier power.

Squelch

Mobile radio systems essentially use the VHF and UHF spectrums where bandspace is less of a premium than in the HF spectrum and where the VHF and UHF frequencies are more suited to the short range communication required. Most of the mobile radio networks now use FM to gain the signal to noise ratio advantage over AM (which was used in earlier systems). SSB has not generally been used and we offer one very good reason for this. A desirable requirement in a mobile vehicle is to maintain the radio silent when no signal is being received. To do this, a "squelch" circuit is used which turns on the receiver audio stages only when a carrier is being received. Of course, a SSB signal has no carrier and the sidebands are only sent on speech syllables. Operation of squelch on these could be erratic, particularly in the presence of noise. So the point is made that SSB is at a disadvantage for systems, such as mobile radio, where a simple squelch system is desired.

CW

Of all the modes of transmission used in amateur radio, what we call continuous wave (CW) transmission is the simplest to generate. The RF continuous wave is simply turned on and off by some manual or automatic keying device to transmit an intelligible code. If we examine the transmitted waveforms with a spectrum analyser, in what we have previously referred to as the frequency domain, we see that the signal is another example of amplitude modulation. The display shows a carrier frequency with sidebands formed from the modulating signal which is a modified square (or rectangular) waveform with its fundamental frequency (or frequencies) set by the keying speed.

Of course, the squared keying waveform must be band limited as a perfect square wave has infinite odd harmonics which would produce sidebands of infinite width. Excessive sidebands are heard as key clicks at frequencies extended either side of the operating frequency. To prevent this, the keying circuit is fed through a low pass filter to limit the harmonics and hence the bandwidth radiated. For satisfactory aural reception of Morse code, references recommend that at least the third harmonic should be transmitted for non-fading conditions and both third and fifth harmonics for fading conditions.

The rate per second at which the keying signal changes its state, either space to mark or mark to space, is called the baud rate. For Morse code, the baud rate has been quoted as approximately equal to the Morse speed in words per minute (WPM) divided by 1.2. For 20wpm speed, the baud rate is thus 16.7 and the fundamental frequency is half that, or 8 3Hz.

Assuming we radiate up to the fifth harmonic of the keying frequency, each sideband is 5 x 8.3 = 41.7Hz wide, and the total bandwidth is twice this, or 83.4Hz. Because of the narrow bandwidth, many more Morse code CW signals can be fitted in a given bandspace than any form of voice modulation. To take full advantage of this fact, a good receiver for CW should have a crystal filter, or some other means, to restrict its bandwidth to hundreds of Hertz.

The CW transmitter is the simplest of all. The RF circuits can all run at maximum efficiency in Class C, and no high power transistor or valve modulator is required, as the modulator is the simple keying circuit. The final amplifier stage in a CW transmitter can usually be run at higher power than the high level modulated final amplifier in an AM speech transmitter. In the latter, instantaneous voltage applied to the modulated amplifier is doubled at peaks of modulation and the stage must be rated to withstand this Furthermore, the power dissipation is continuous whereas, in the CW transmitter, average power is reduced by the on/off keying operation

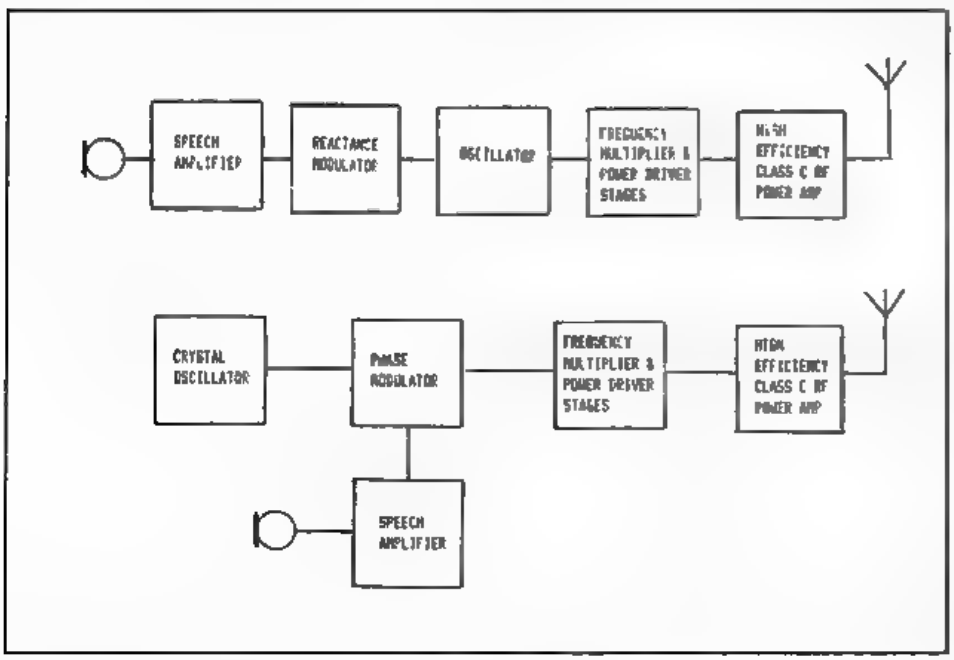

Fig 9 · Typical frequency modulation transmitters.

Frequency Shift Keying

In automatic radio telegraphy and digital data transmission systems, we normally use frequency shift keying, as this is another form of frequency modulation which gives improved signal to noise ratio. Radio teletype (RTTY) as used in

amateur radio generally runs at a baud rate of 45.45 (and sometimes 50) with a frequency shift of 170Hz. The fundamental modulating frequency is thus 45.45/2 = 22.73Hz and the frequency deviation is 170/2 = 85.5Hz The modulation index at the fundamental frequency is therefore 85 5/22 73 = 3 76 which, from figure 6, gives a signal to noise ratio improvement of 16dB over AM or amplitude keying.

From references, the minimum bandwidth for the teletype is given as being equal to baud rate plus frequency shift multiplied by 1.2. Using this, minimum bandwidth = 45.45 + 170 x 1 2 = 249.45 (let's say 250).

In amateur radio teletype we use audio frequency shift keying (AFSK) and use standard frequencies of 2125Hz for mark and 2295 for space or 1275Hz for mark and 1445 for space. By feeding these tones into the audio input circuit of our SSB transmitter, the RF single sideband generated appears as if we were simply shifting a carrier at 170Hz of shift.

Using FM equipment at VHF, the tones are again fed to the audio input, but in this case we have a frequency modulated audio sub-carrier in turn frequency modulating the RF carrier. In this case, derivation of the significant bandwidth is a little more complicated. The audio bandwidth is calculated as before as equal to 250Hz. The highest frequency in the audio tones is then determined and, for the 2125/2295Hz tones, this is worked out by taking the average of these frequencies and adding it to half the audio bandwidth. The result is 2334.5Hz. The radiated FM bandwidth is now worked out by adding the highest audio frequency result to the frequency deviation used and multiplying by 2. For 5kHz deviation, the significant bandwidth works out to 14.669kHz.

Using frequency shift of the carrier, as is achieved by feeding the audio tones into the SSB transmitter, the RTTY transmission is a narrow-band mode similar in bandwidth to Morse with CW transmission. Feeding the tones into an FM transmitter (or, for that matter, a double sideband with carrier AM transmitter), the RTTY is a wide-band mode similar to speech.

Packet radio systems operate at much higher baud rates than RTTY, and baud rates vary from 300 — often used on the HF bands — to 9600 for meteor-scatter and satellite communications where access time is limited. A 300 baud system using an RF carrier shift of 200Hz has a modulation index of 0.67 and requires a bandwidth of 540Hz. Higher baud rates (typically 1200 on the VHF band) call for bandwidths comparable with speech or greater.

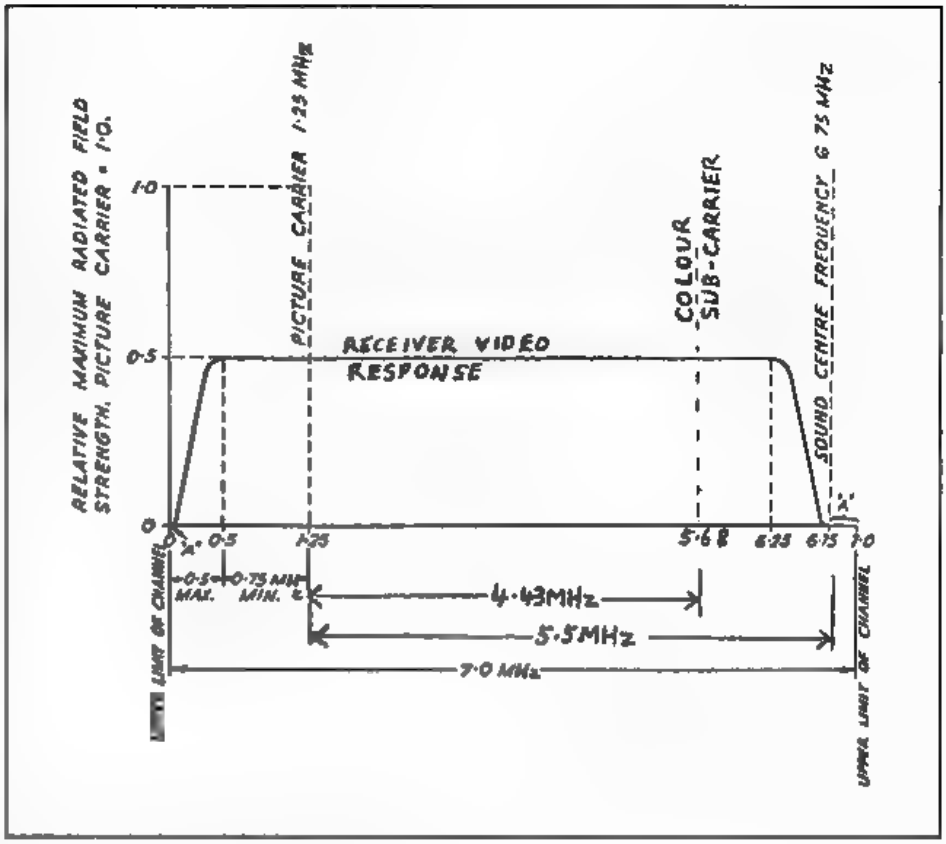

Fig 10 — PAL television signal format.

Television

To reproduce, with high definition, the picture elements in a PAL system TV picture, video components approaching 5MHz must modulate an RF carrier. Together with the sound, which also modulates a carrier, a total bandwidth of around 7MHz is needed. In a standard PAL system, the video signal amplitude modulates the vision carrier, and one complete sideband is fully transmitted. For the other sideband, bandspace is reduced by transmitting the low frequency modulation components of the sideband up to around 1.25MHz. The system is called vestigial sideband transmission. Whilst only one complete sideband is needed to convey the signal information, there is a problem in making a sideband filter without phase shift around its cut-off frequency. Reproduction of the TV picture is seriously affected by phase shift in the low frequency components and, hence, the sideband cut-off is shifted up to well above the frequencies which are most affected.

To take advantage of the improved signal to noise ratio of FM and the high quality sound reproduction which can be achieved, frequency modulation is used in the TV broadcasting system. The system also minimises interference from the amplitude modulated video signals. The sound carrier is spaced exactly 5.5MHz from the vision carrier and, in the TV receiver, the two carriers beat together to form the 5.5MHz sound IF channel.

The standard PAL signal format is shown in figure 10. This shows the vestigial sideband arrangement and the difference frequency of 5 5MHz between the vision and sound carriers. For colour TV, an additional 4.43MHz colour sub-carrier is superimposed on the video signal and this appears as a single sideband component 4.43MHz above the vision carrier As seen by the diagram, the system takes up a bandwidth of 7MHz, some hundreds of times the bandwidth used by even our widest speech modes. Hence, amateur TV is confined to the UHF bands where more bandspace is available Amateur TV may also operate as a double sideband system and, as seen in figure 11, it takes up a bandspace of over 11MHz. Fast-scan TV (as we call the system described) is clearly not suitable for the lower frequency bands. However, there is a group of enthusiasts who transmit slow scan TV which requires a more modest bandspace

In the PAL TV system, the complete picture or frame is scanned 25 times per

second, and each frame is made up of 625 lines (including those which are not seen during the scan retrace). In slow-scan TV, the scanning rate is slowed down to one frame in a number of seconds, and the number of lines in a frame is reduced. Images appear as a series of still pictures which change with the movement of the televised object rather than as a continuous moving picture. Bandwidth is reduced both by the reduction in scanning speed and by transmitting picture elements of lower definition. Using slow-scan TV, signal bandwidths comparable with speech can be achieved, and hence it is feasible to transmit on the HF bands.

Summary

Various forms of modulation and how they are applied to the modes of transmission have been discussed. In amplitude modulation, there is much to be gained in suppressing one of the sidebands and the carrier signal. Hence single sideband transmission has been phased in over the years in preference to the basic AM system. Advantages are a reduction in bandspace, elimination of heterodyne whistles heard on the band and more effective use of RF power generated in the transmitter. For a given effective signal, a lower power rating in the RF amplifier and a smaller power supply are achieved.

Frequency modulation has a signal to noise ratio advantage over amplitude modulation, but to gain the advantage, the modulation index must be greater than 0.6 with a resultant bandwidth on speech considerably greater than that required for amplitude modulation. Because of this, FM is essentially used on the VHF/UHF bands where the wider bandwidth can be better accommodated.

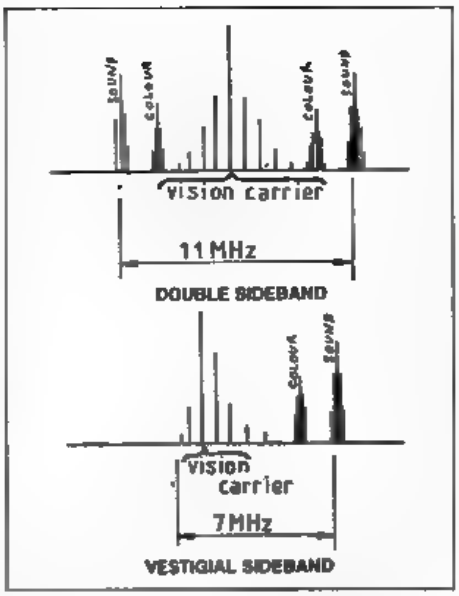

Fig 11 — Comparison of double sideband and vestigial sideband TV signal formats

CW transmission, as we know it, is a form of amplitude modulation, and bandwidth must be allowed for the sidebands generated from the keying characters. At hand-keying speeds, quite low fundamental frequency components are generated. Hence CW signals occupy a narrow bandspace provided the keying signal is adequately filtered to remove higher order harmonics.

Frequency shift keying, as used in RTTY and digital data systems such as packet radio, is a form of frequency modulation in which significant FM sidebands are generated. The bandwidth of these sidebands is determined by the baud rate (or modulating frequency component) and the amount of frequency shift (or frequency deviation).

Fast-scan television has such a wide bandwidth that amateur experimentation is restricted to the UHF bands. Slow-scan television, as used in amateur radio, has a bandwidth comparable with speech and can be used on the HF bands.

For further reading, some excellent material on modulation and data transmission systems can be found in the latest issues of the *ARRL Handbook*. References to this and other sources of information are included following.

References

1. *ARRL Handbook 1989*. Chapters on "Modulation & Demodulation", "Digital Communications", "Voice Communications".
2. R F Dannecker VK4ZFD "The FM System", *Amateur Radio*, Dec 1989
3. A H Kaye. "Frequency Modulation, Principles & Equipment Fundamentals", *Amateur Radio*, Nov 1947.
4. John Kennewell & Kenneth Brown. "Frequency Modulation & Sidebands", *Electronics Australia*, Nov 1983
5. Bryan Maher "FM Bandwidth & Frequency Response", *Electronics Australia*, Jan 1990
6. Lloyd Butler VK5BR. "Spectrum Analyser Waveforms", *Amateur Radio*, Sept 1987 page 24
7. *Australian Amateur Call Books 1983/84* or *1984/85*. WIA Publication, "Amateur Fast-Scan Television". ar

Propagation of Long Radio Waves

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(CONTINUED FROM JUNE ISSUE)

PART 2. HIGH FREQUENCY PROPAGATION IN BRIEF...

IN THIS SECTION IT IS PROPOSED to point out some main, and some possibly less known, features of high-frequency propagation, and then show how this differs from low-frequency propagation. Many characteristics of high frequency propagation are well known, and will be only referred to here.

Surface Wave Propagation

At high frequencies, the processes resulting in surface wave propagation are usually of little importance. Quite often sky wave signals and general band noise are sufficient to drown out surface waves beyond a few kilometres. Also, antennas on HF are not usually designed to optimise surface wave conditions.

Ionospheric Reflection at HF

Propagation of high-frequency waves much beyond the horizon and to great distances, depends upon reflection between the earth and the ionosphere. The process of reflection is caused by a decreasing "effective" refractive index of the ionised media with height. Reflection takes place when the wave reaches a point where the refractive index is sufficient to cause total internal reflection. In other words, the wave is refracted to a point where it is turned and returned to earth, see figure 3. (Note that in all propagation diagrams for clarity the height scale is four times that of the distance).

The ionosphere starts at roughly 70km above the earth's surface in the day an 90km at night, and increases in intensity and height to about 300 and 400km. Above this, ionisation decreases with height and is, therefore, of no consequence. The ionosphere is layered. The existence of the D, E and F layers is well known. The layers are diffuse with ionisation in between. In fact, it is probably rare to have a decrease in ionisation between the layers.

As far as high frequencies are concerned, most significant reflection takes place in the F layer, with some reflection taking place in the E layer during the day. On HF, and particularly for DX, E layer reflection is more of a nuisance than an advantage. For more information the reader is referred to the many articles on the subject of HF ionospheric propagation, some of which have been published quite recently. A very useful article, "Why is there a Maximum MUF" (Ref 1) appeared several years ago, and presents a very good basic view of HF ionospheric propagation.

Air has a refractive index slightly higher than 1, the refractive index of a vacuum equals 1. If normal physical variations were to take place in air, only very small differences in refractive index can exist and, therefore, reflection can take place only at a low angle to any layer of discontinuity in refractive index. The ionosphere can reflect at a high angle to the plane of reflection and even at right angles to the plane. Since a medium cannot normally have a refractive index less than 1, it is, therefore, obvious that the behaviour of the ionosphere is quite different from that of a normal medium.

From formula 2, if $n_1=1$ (approx for air) and i is a small angle, then total internal reflection can take place only if n_2 is less than 1. See formula 3:

$$\sin r = \frac{\sin i}{n_2} \qquad (3)$$

also, if i approaches 0^0, that is, reflection at right angles to the plane, then n_2 must approach 0^0.

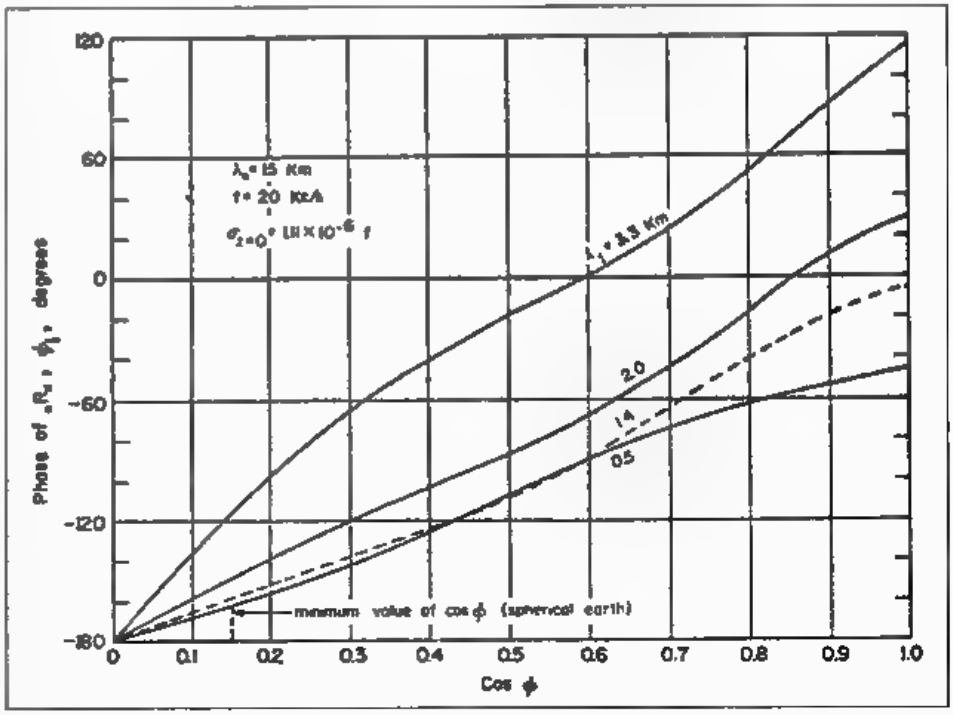
The effective refractive index 'n of an ionised medium is given by:

$$n = \sqrt{1-81N/f^2} \qquad (4)$$

where N is in electrons per cubic metre and f is in Hertz, N is usually in the order of $1x10^{11}$ to $7x10^{12}$. It is obvious from this formula that *n* can have a value less than 1 or less than 0 (unreal). If a wave is projected vertically into the ionosphere and is turned around by the process of refraction, then not only must the refractive index be less than 1, it must equal 0. Substituting $n=0$ into the above formula we come up with the often quoted formula:

$$Nmax=fc^2/81 \qquad (5)$$

where fc is critical frequency and the formula tells us the ionisation density necessary to return a vertically projected signal to earth. Thus a vertical signal of a given frequency will pass into the ionosphere to a point where the electron density equals Nmax from where it will be returned to the earth's surface. If the



Phase of the ionosphere reflection coefficient as a function of the angle of incidence for various conductivity gradients.

angle of incidence is greater than 0° or the take-off angle is less than 90° to the ground, less ionisation is required to return the signal (see ref 1 and 2). For an angle of incidence greater than 0:

$$N=(f\cos i)^2/81 \qquad (6)$$

As referred to above, we know that refractive indices cannot normally be less than 1 or the wave propagation would be faster than light (or even faster than infinity)! When a radio signal passes through the ionosphere the electrons are caused to oscillate and, since they have mass, some energy is used in overcoming inertia. If there are no collisions between electrons and atoms there is no energy lost, and the energy in the oscillating electrons is returned to the system in the form of radiation in a different phase from the original. The process of taking energy and returning it to the system is known as *reactive* and is directly analogous to a capacitor or inductor in an electric circuit in which lossless current is drawn by the component. As referred to above, refractive index is directly related to permittivity. The ionosphere with its low refractive index also has a permittivity less than 1, and can be looked upon as analogous to capacitors in the sky! Energy being absorbed and re-radiated in this reactive medium is the effect that results in the wave being reflected or refracted.

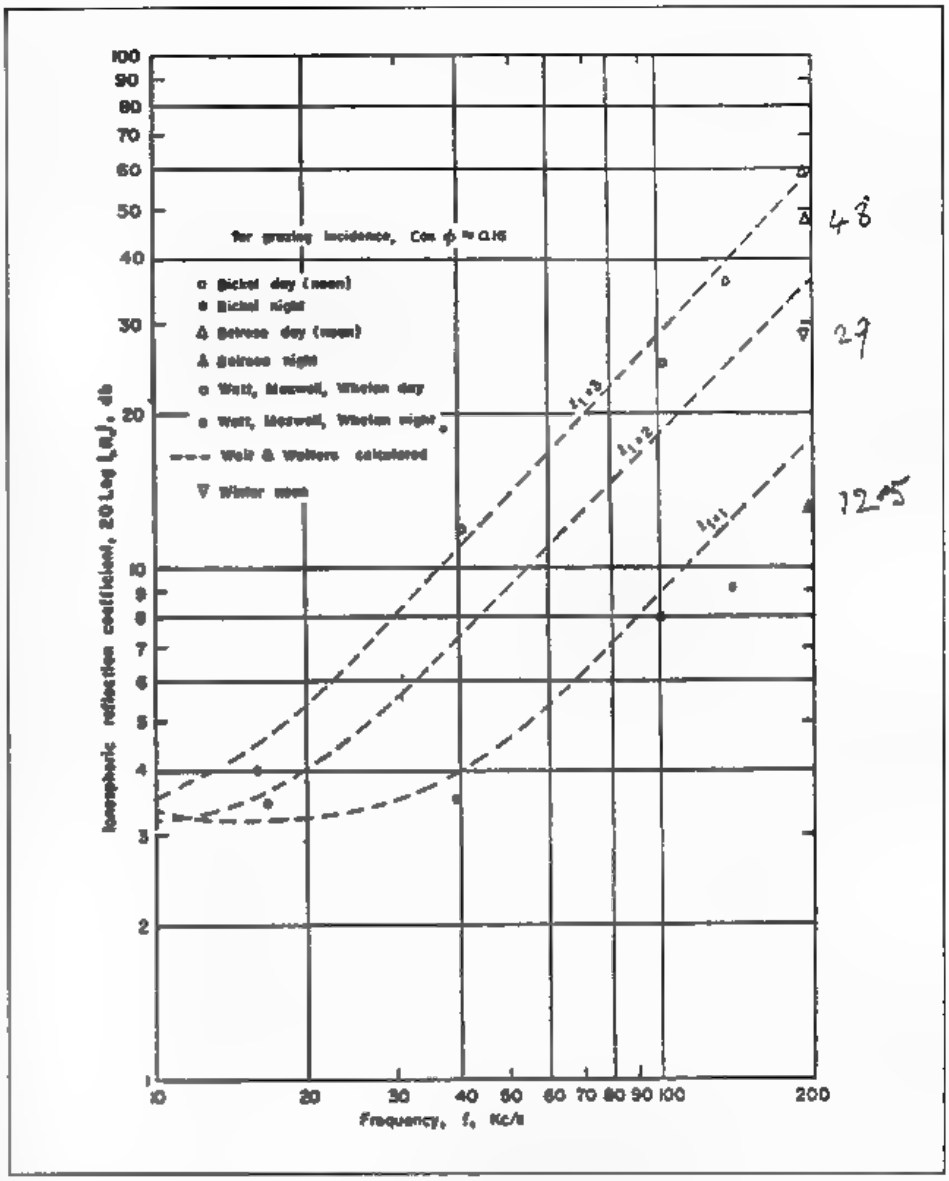
So this behaviour of electrons in the ionosphere causes it to behave like a medium with a refractive index less than 1. What about waves travelling faster than light? We all know this is impossible. What actually happens is that the wave has two velocity components, phase velocity vp and group velocity vg (ref 2). This is a characteristic of propagation in a medium where the velocity is a function of frequency. With the phase velocity, the carrier waveform appears to move forward in time. At the same time, because of the reduced group velocity, the modulation on the wave appears to slow down. We, therefore, have a rather negative kind of refraction and reflection of HF radio waves in the ionosphere. While the wave appears to speed up as it is bent round and returned to earth, it actually slows down. The interested reader is referred to the many texts on this subject, including the reference above.

Ionospheric Absorption at HF

At the lower edge of the ionosphere there is a rather mysterious region we call the D region. The D region lies between 70 and 90km above the earth; it has no critical or maximum usable frequency but causes loss to signals passing through it at HF. Loss in the layer is large in daylight and practically negligible at night. Its loss increases with decreasing frequency and is high enough to form an almost complete blanket to sky-wave propagation below 2MHz in the daytime. This layer prevents long-distance communications over daylight paths on 7MHz and, to some extent, on 14MHz.

The D region is of great importance in LF propagation and will therefore be dealt with in more detail in the next section.

(to be continued)



A comparison of observed and calculated ionospheric reflection coefficients vs frequency for near grazing angles

References

1. "Why is There a Maximum MUF. Amateur Radio Action, Vol 6, No 6, 11 Oct '83
2. Transmission and Propagation Services Text Book, Vol 5, 1958, H M Stationery Office, 1958Appendix 14.3 and Chapter 14. Also many other similar texts. ar

Errata

Sweep Generator Circuit, Page 9 *AR* April 1991

Some anomalies have been brought to my attention in the connections to N3, the MC1496 balanced mixer. The output pins omitted should be 6 and 9. Also, resistor R18 should connect to pin 5, not pin 6. The pin connections shown are for the TO5 metal package and will be different for the plastic DIL package. The other packages, N1 and N2, are both DIL.

Lloyd Butler VK5BR ar

Feedline Losses and VSWR

GRAEME MCDIARMID VK3NE
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FOR THOSE INTERESTED IN THE effect of feeder losses on VSWR measurement at VHF, here is some food for thought.

To achieve the SWR readings shown below I have used the following figures:

1. Frequency 146MHz
2. Feeder length 30 metres
   a) RG8 has a loss of around 3dB at 146MHz
   b) RG58 has a loss of around 6dB at 146MHz

SWR Reading at Transmitter	Coax	SWR at Antenna
1.1:1	RG8	1.21:1
1.2:1	RG8	1.44:1
1.5:1	RG8	2.33:1
1.6:1	RG8	2.71:1
1.7:1	RG8	3.14:1
1.8:1	RG8	3.65:1
1.9:1	RG8	4.25:1
2.0:1	RG8	4.67:1
1.1:1	RG58	1.47:1
1.2:1	RG58	2.13:1
1.5:1	RG58	8.81:1
1.6:1	RG58	23.6:1

The results for RG58 show that a large increase in SWR at the antenna will only give a very small increase at the transmitter.

A Practical Example

Using a typical twin-needle SWR meter you obtain the following readings:

Forward power = 16 Watts, reflected power = 1 Watt

VSWR (where the needles cross) = 1.7:1

While 1.7:1 is not a particularly good reading, it is quite acceptable, and most VHF transmitters would produce close to full output (16 watts or more from a 20-watt TX).

What do these readings mean?

1. If you used RG8, you probably have a VSWR of 3.14:1 at the antenna. This is a fairly high figure and it should be possible to improve it by making various antenna adjustments.
2. You used RG58. This situation is very different than the previous one. It indicates that your antenna may not be connected, or there is a short/open circuit at or near the feed point.

How did I arrive at the answer for RG58?

The two power figures shown above give the reason. If you feed 16 watts into a cable that has 6dB loss, only four watts will arrive at the other end (6dB is a power ratio of 4:1) A cable that is not terminated or has a short circuit will reflect all of the power that arrives there. This means that four watts will be fed back down the cable. Again a 6dB loss will occur, and only one watt will arrive at the SWR meter. The ratio of 16 watts forward to one watt reflected is a VSWR of 1.67:1.

Summary

This has been a brief look at VSWR from a practical angle. You may think I haven't been very practical in looking at an antenna feedline using 30 metres of RG58.

How often have you heard of someone using a long length of thin cable of dubious origin?

A shorter length of poor quality cable, or a length of good quality cable that has been damaged could have losses exceeding 6dB.

Don't think you are safe because you have used the best quality cable you could afford.

(a) What happens if water gets into the cable?
(b) What happens after a few years of flexing and UV exposure?
(c) Some cables suffer from contamination due to the plasticiser used in the outer jacket.
(d) The figures provided are for VHF; by how much does the loss increase if you decide to move up to 430-440MHz or higher?

It makes common sense to use the materials you have at hand or can afford. High feeder loss may not be a problem where there is sufficient power output, or signal strength is very high.

At times I have deliberately introduced additional feeder loss so that the transmitter will see a reasonable VSWR when using an antenna not designed for that frequency.

Try using an external, elevated 70cm antenna instead of the rubber ducky on your handheld. If the existing feeder has 2dB loss at 2m, and the VSWR is approximately 3:1 (at the bottom of the co-ax, 9.1 at the antenna), a 20m length of RG58 will bring the VSWR down to 1.5.1).

I have provided this information to help you make more sense out of the readings you obtain when measuring VSWR at the shack end of your co-ax. Just be aware of what effects feeder loss may have on the readings you take.

Getting started with amateur radio satellites

PART 6

BILL MAGNUSSON VK3JT,
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I HOPE YOU'VE HAD SOME success with Oscar-10 or Oscar-13 over the past month. If you've kept your station up with the series you should now be able to cope reasonably well with many of the current batch of amateur radio satellites. Next month I'm going to discuss digital communication satellites and look at their store and forward, BBS and digipeating capabilities.

Flavour of the month is AO-13. If we look at setting up an optimum station to work through this bird and add a good, multi-mode modem, it will cope with just about anything the future will hold.

Let's look at AO-13 in a bit more detail than the brief coverage last month. You'll remember I mentioned it had a mode B transponder. It also carries mode J; that's the reverse of mode B. So, if you've got a transceiver for 2m and one for 70cm, or one of the multi-band, multi-mode jobs, you're set up for both these modes of operation. AO-13 also carries a mode L transponder. This is a UHF to microwave device. It listens on 435MHz and has a downlink on 1269MHz (23cm). This one is not much good to us here in Australia at the moment. The orbit of Oscar-13 is drifting further into the northern hemisphere and, as it does, the apogees will occur below our horizon most of the time. This is unfortunate, as mode J and mode L are only turned on near apogee to take advantage of the best squint angles. Our operating through AO-13 will be restricted to mode B for the next two or three years, when once again AO-13 will drift towards the southern hemisphere. The drift is affected by the inclination AO-13 has an inclination of nearly 57 degrees It was designed to have an inclination of 63 degrees If the orbit insertion had gone according to plan and the inclination had turned out to be exactly 63 degrees, the satellite would not have drifted. It would have stayed orbiting with the apogee a little north of the equator. At that inclination all the gravitational forces acting on the satellite are in balance. Such an orbit is called a Molniya orbit after the Russian satellite which first used it. Molniya is the Russian word for lightning. Many commercial satellites are launched into this type of elliptical orbit.

AO-13, ie Amsat Oscar-13, has another transponder on mode S. This is also a UHF to microwave device. It has an uplink on 435MHz and a downlink on 2400MHz. It is also scheduled on for short periods around apogee. You need very good squints to successfully work modes L and S.

If we wanted to work all these modes we'd need antennas and SSB rigs on 145, 435, 1269 and 2400MHz. This is quite a tall order, but many operators do it. The higher frequencies can be transverted up from 145 and 435MHz. The antennas don't present so much of a problem as they get smaller and easier to handle. An entire array for all these can be mounted on the one AZ/EL rotator system. At the higher frequencies, of course, feedlines, pre-amps and plumbing become a problem. If you're already a microwave operator you have a head start here. If not, it may well be wise to concentrate on modes B and J and fully investigate them before moving on to something quite a bit more demanding like modes L and S.

Our optimum station would require a reasonable amount of power, say 50 watts, to cover all conditions. You would need this on 145, 435 and 1269MHz. Fortunately no transponders uplink on 2400MHz ... yet. The receive systems would need to go for the best part if 18dBi in the antennas. And that's not easy. You would need a pre-amp, definitely a GaAs-FET on the higher frequencies. It MUST be mounted at the feed point.

If you are thinking of working any of the digital modes, you will need to put together a computer controlled antenna pointing system. Probably the best one is the Kansas City Tracker. This can work in conjunction with several modern tracking programs, and has the added feature of the Kansas City Tuner which takes care of Doppler shift automatically on your downlink. This is a real boon for digital operation.

Last month I mentioned circular polarisation. The majority of antennas carried on amateur radio satellites are circularly polarised. DX operators are familiar with the way signals received by ionospheric refraction are knocked about quite badly by fading due to random polarisation changes. All satellites operate outside the ionosphere. I'm sure you've realised that already. They wouldn't last long in amongst it. This means that all satellite signals must pass through the ionosphere to get to your station. As well as this, most satellites either spin or tumble in orbit, causing the polarisation of their signals to change or even reverse. The best way of handling these problems is to employ circular polarisation at both ends, and your end needs to be switchable from right to left hand. There are many ways of generating a circularly polarised signal. Let's look at a few. The crossed dipole or turnstile is the best known. This is useful for receiving and transmitting to low-earth orbiters like DOVE, UoSat and RS-10/11. It consists of two dipoles, usually horizontal and mounted at right angles to each other. One is fed directly by the co-ax feeder, and the other is fed via a $^1/_4$ wave feeder from the feed point of the first. The hand of polarisation can be changed by changing the feeder to one end or other of this $^1/_4$ wave "phasing" section. You can mount the turnstile $^5/_8$ wave above a ground plane to give it a kidney shaped vertical radiation pattern which is useful for satellite operation You can be really clever and use a relay at the feed point to change from right to left hand if you like.

It's well to remember that all circularly polarised antennas only exhibit true circular polarisation directly along their axis. As you move away from the axis, the polarisation becomes elliptical, ie it has more of one linear polarisation than the other. This is not a bad problem, as with tracking antennas you will be trying to point as closely as possible at the satellite. With the turnstile you just have to put up with it. I guess you could track the turnstile, but if you're going to do that you may as well go for a better antenna.

You can make your turnstile into a crossed yagi This is essentially two yagis mounted on the same boom, but at 90 degrees to each other. They are fed in the same way as the turnstile With a $^1/_4$ wave

phasing harness that can be switched to give right or left-hand polarisation. This arrangement is very popular. You would find this type of antenna at nearly every satellite operator's QTH. You can make the boom as long as you feel you can cope with. Boom lengths of three to four wavelengths are not uncommon. Combined with a good pre-amp up at the feed point, this setup is hard to beat. The pre-amp will overcome feeder losses on receive but remember that your transmit signal will benefit greatly if you use only the best co-ax for all satellite work.

The helix is an excellent antenna and well worth a try. But if you're going to build one, make sure it's a good long one and don't take ANY short cuts along the way. A helix is a bit cumbersome at 2m, but some operators use them. On 70cm a boom length of only three metres will give a gain of 19dBi(c) if you take care with the construction. That term dBi(c) needs a bit or explanation. It means decibels over an isotropic source and truly circular. This represents an advantage over our crossed yagis of some 3dB for the same boom length. The reason being that the feed is split to feed both yagis so each one gets only half the power. You get that back at the other end, of course, if the other antenna is also circularly polarised and the signal arrives intact (which it may not). With the helix you also overcome losses incurred in the phasing harness.

The only disadvantage of the helix is that it cannot be switched from right to left-hand polarisation. This probably accounts for its unpopularity. They certainly work well. If you want to try one, make it right hand, as this is the most widely used system on the satellites.

If you've followed this series right through you'll have realised by now that this satellite business is rather wide and rather complex. It's the sort of thing you can devote a lot of time to if you get the bug. As I said in the very first opening paragraph, you must hasten slowly. Your enjoyment will depend a great deal on up-to-date information. There's a lot of information available, but much of it gets out of date rather quickly. My advice is to get hold of a good basic text, read it thoroughly and keep referring. *The Satellite Experimenter's Handbook* from ARRL is good value. It contains lots of practical projects and good basic, easy-to-understand operating hints. The RSGB's VHF-UHF manual is great for general information on equipment for use in this part of the spectrum.

I'd also strongly advise that anyone with an interest in amateur radio satellite operation should join a special interest group, in our case, Amsat Australia. You can get details from Graham VK5AGR at GPO Box 2141, Adelaide 5001 He distributes an excellent up-to-date newsletter full of useful information. You can also keep an eye on your local packet BBS. These are also a good source of information. Lastly, of course, the satellites themselves have bulletins coming down with the telemetry stream. A serious operator would do well to exploit all these means to keep well informed.

Next month, digital communications by satellite and a complete list of presently operating satellites.

ar

Don't buy stolen equipment - check the serial number against the WIA stolen equipment register first

Further Experiments with Horizontal Loops

BY JOE ELLIS VK4AGL
BURNSIDE RD NAMBOUR 4560

SINCE WRITING THE FIRST PART of this article I have had an opportunity to erect an 80m horizontal loop at my own property and, although it takes many months of observations to come to proper conclusions on any antenna, here are some comments for what they are worth.

It has become clear to me that any antenna is conditioned by its own environment. By this I mean that adjacent buildings, towers, guy wires and trees modify results obtained at other locations. For instance, the identical antenna erected east of Gympie performs well on 10m; here it does not perform all that well, and does not auto-tune with the TS440S transceiver.

I have had communication on most amateur frequencies, with the best results on 20m against the reference antenna which is a TH6DXX. On 40m it outperforms the reference antenna , which is a dipole. While in contact with 9X5NH in Central Africa, on 17m, I noted that the report given me was about the same as those given to other stations in Australia. The loop seems to transmit better than it receives; this may be because the TS440S auto-tunes the transmitter, but not the receiver, without modification.

The Horizontal Loop concept continues to excite attention overseas, and much experimental work has been done. Paul Carr N4PC has done some computer modelling which has now been published in *CQ* magazine. He has also tried the loop with the corner opposite the feedpoint opened. This virtually turns the loop into a rhombic. One bonus from this move was that it became a fairly efficient radiator on 160m. It is, after all, just a dipole now folded back on itself. There can be no argument with the criticism that the loop is just a cloud-warmer on the fundamental frequency of 80m. For this reason, Paul N4PC has come up with further experiments using a $^{3}/_{4}$ wave loop. This works out at 51 feet per side, and the immediate result is that the vertical pattern is split into two lobes with maximum radiation at 40°.

The horizontal pattern is essentially omni-directional. It should be noted that Paul uses 450 ohm balanced feedline, whereas here we have tried both RG58 and RG59 coaxial cable.

Paul claims no expertise in antenna theory. He says that in Alabama there is a saying: "If you place a blind hog under an oak tree, it will eventually find an acorn." He thinks he has found his acorn. I will reserve my own decision until many more observations are made here at this QTH. **ar**

Cover Story

Darcy Hancock VK5RJ, who is featured on the cover of this issue, has been a licensed amateur since 1927, and a WIA member continuously since the 1930s. For most of this time (until about 1960) he was handicapped by the fact that the power supply in his home town of Kadina was 200 volts DC. It was changed to AC not long before he retired from his electrical contracting business and moved to Adelaide in 1965.

Darcy operated mostly CW in the early days, but was also active on phone (AM was then the only mode). He is still active on most bands using a commercial SSB transceiver.

Nevertheless, he still does some home-brewing of small items like test equipment.

Comparing past years with the present, Darcy remembers that noise levels were very low in the 1930s. It was not at all unusual to be able to listen to American stations on the AM broadcast band, but, as Darcy says, "Now, with all the noise-making appliances connected to the power mains, it is a very different situation."

When he began operation in 1927, Darcy's callsign was A5RJ and, later, OA5RJ. The prefix VK for Australia dates only from 1929. May we continue to hear and work VK5RJ for many more years to come! **ar**

Support the WIA in order to protect amateur radio frequencies at WARC 92

Random Radiators

RON COOK VK3AFW &
RON FISHER VK3OM

AS USUAL, WE HAVE FOUND some interesting antenna stories for you this month. However, a few observations on some of our past articles. As mentioned in our last episode, we expected to have some feedback on the Quad vs Yagi story, but so far not a word from anyone. Where are all the Quad enthusiasts out there? I guess it must be a fact that Yagis do outperform Quads. I must admit that I have never used a Quad, but I am open to suggestion. In fact, if there is a Quad owner who thinks he has a world-beating antenna out there and would like to put it to a side-by-side test with a Yagi, one of the two Rons has two towers where such a test could be carried out. Any takers?

Our first story this month is from Rod Torrington VK3TJ. Rod says that over the years he has not had complete success with antenna coupling units; however, an ATU described in the 1965 ARRL handbook has proved to be 100 per cent successful on all bands, including 10, 18 and 24MHz. Rod says that it's an ARRL idea and not his, which might be true, but thanks for bringing the idea to us. Over to you, Rod.

Antenna Coupling Units

Experience has shown that some antenna coupling units may be quite satisfactory on some bands with some aerials, but will not load up on all amateur high frequencies.

The circuit shown here has proved to be very versatile, and it was possible, due the various circuit configurations (see A through E) to load a co-axially fed 20m/40m trap double as a random wire (ie with the inner and outer of the co-ax tied together) on all bands from 160m to 10m with a VSWR at the transmitter (a TS530s) no worse than 1 2:1.

The *ARRL Handbook* 42nd edition 1965 supplied the circuit. The switching to any one of the five L and C combinations can be performed by a three-pole five-position switch (not readily available these days) - see figure 2 or, quite conveniently, with six banana sockets and three jumper leads terminated in banana plugs - see figure 1.

Normal two-gang broadcast receiver (the old valve type) capacitors (approx 20 to 400pF) were used, only one gang on each connected. The capacitors need to be at least 150pF. No arc-over has been experienced on any band with the TS530s.

A multi-position switch can be used for coil tapping, or an arrangement for connecting a wandering lead clip to the coil tap points can be made.

More on indoor and minimal space antennas.

Some months ago we discussed a few antennas that could be set up either inside a room or, perhaps, in the roof space of a home unit. We got very little feedback on this from readers, but I know there are many amateurs out there who feel that they cannot get on the HF bands because of antenna restrictions.

First, a story that might encourage some of the reluctant to give it a try, and then a description of an interesting indoor loop transmitting antenna.

A few months ago, I worked a station in Milwaukee USA on 20m. Not unusual, I hear you say. True, but he was mobile. (Still not too unusual). But he was mobile riding a bicycle. (Ah!) The station was WB9GIE, and the operator (rider?) Elroy Shelley. Elroy was using the following equipment: A Ten-Tec Argonaut 509 QRP transceiver running all of three watts output, powered by a set of alkaline "D" cell batteries. His antenna, a Hustler mobile whip mounted on the rear parcel carrier of his three-speed Raleigh bicycle. At the time of our contact, Elroy was pedalling his way to work on the north-west side of Milwaukee along the shore of Lake Michigan. Elroy says that so far I am his best DX, but I gather that he works around the US on a regular basis. He also works 2m with an ICOM IC-2AT. The photo tells the whole story. While it is obviously not the usual thing for Elroy to work into Australia, it does go to show that an amateur in a home unit or a small flat using, say, an indoor dipole and 100 watts output, should be able to produce many satisfactory contacts, at least around Australia. But, read on; we might have something even better than an indoor dipole.

The Magnetic Loop Antenna

The transmitting loop antenna is creating a lot of interest amongst indoor antenna users. It is relatively easy to construct and doesn't take up a lot of space. This one was described in the April 1988 issue of the English magazine, *Ham Radio Today*, by Tom Hall GM3HBT. I have actually worked at least six "G" stations which were using anten-

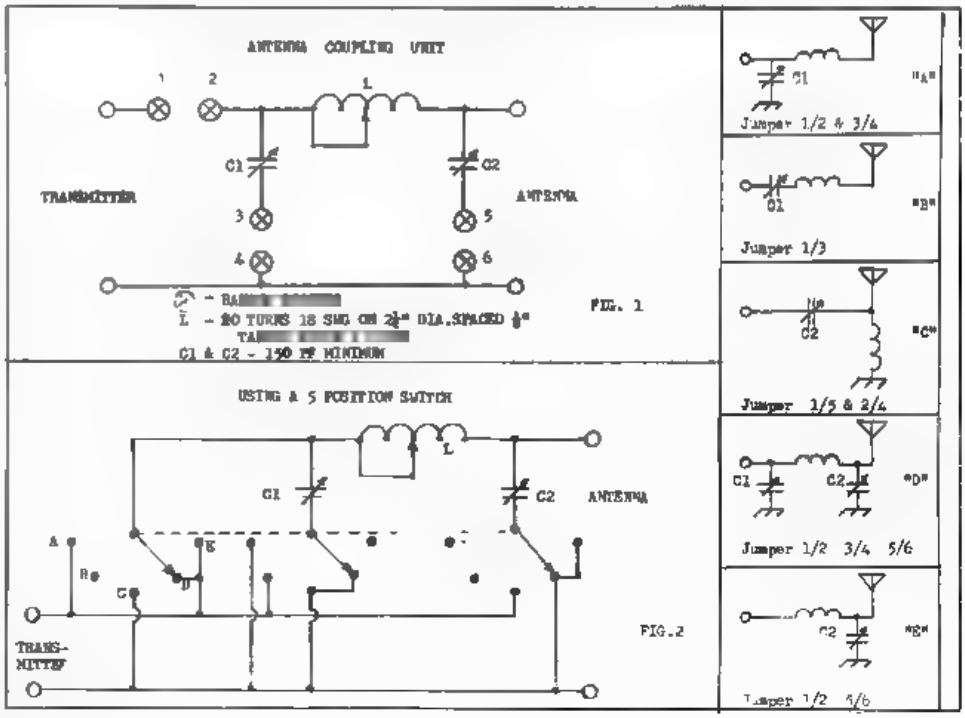


Figure 1. (Top). Figure 2 (Bottom)

nas similar to this Transmitting loops antennas are available commercially in the UK, but are actually quite expensive, due to their construction. They feature full remote control for both tuning and rotation. However, for indoor use, a home-built one might cost only a few dollars. The construction is simple and is shown in detail in the drawing. The loop is made from 3m of 12-15mm diam soft copper tubing. The tuning capacitor needs to be wide spaced with a maximum capacitance of 100 to 200pF. The lower capacitance will tune from 10 to 18MHz, while the higher capacitance will tune down to 7MHz Unless your capacitor has a very low minimum capacitance, it is unlikely the loop will tune up to 28MHz. In most cases, a slightly smaller loop will be needed. The capacitor also needs to be of very solid construction, as resistance losses in the rotor bearings can make a significant difference in overall performance. Some loop users suggest that a split-stator capacitor is actually superior, because it eliminates most of these losses. Because the tuning of the capacitor is very sharp, a 6:1 reduction drive is desirable.

The Matching Stub

Some loop antenna designs show a separate small coupling loop at the base of the main loop, but this design uses a much simpler and much less critical gamma match system. The flange of a standard SO-239 co-ax socket is soldered to the base of the loop and its centre pin connected to a piece of stiff co-ax braid about 20cm long This is bent over in a semi-circle to a point on the loop about 15-18cm out from the connector. The best actual spot for a compromise match on the bands covered by the loop must be found by experiment. Now all you need to do is connect the loop antenna to the rig via a length of 50-ohm coax cable.

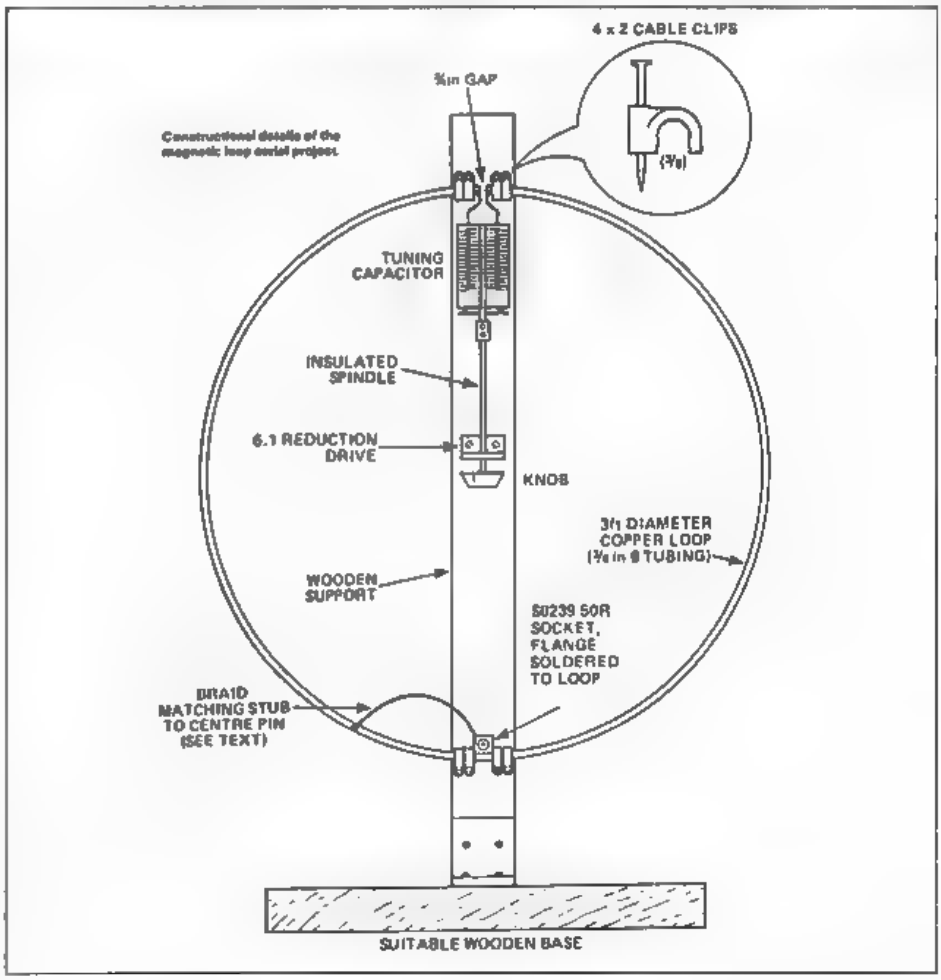
To tune the loop for normal operation, peak the tuning capacitor when receiving on the frequency required. There should be a sharp increase in band noise at resonance. Now transmit a low power carrier and tune again for minimum SWR. If this is not near unity, adjust the position of the stub until a low SWR is reached. With careful adjustment, the SWR should be below 1 5·1 on all bands.

I have actually got one of these loops going at the moment, and find that it tunes exactly as above. However, results achieved have not been as good as expected I am working on this, and will report back in the near future Also, Lloyd Butler VK5BR has been working on a similar loop and his article will appear in *AR* very soon

Again, thanks to *Ham Radio Today* for permission to reproduce its drawing and to quote from its article. *HRT* is a magazine I can recommend. It is available through many of the larger Australian bookshops or can be obtained direct from HRT Subscriptions Dept, Select Subscriptions Ltd, 5 Riverbank Park Estate, Berkamsted, Herts HP4 1HL UK. Price 27 pounds, 50 pence.

And that's all for this month, so its good bye from him and good bye from me. *The Two Rons.* **ar**

WB9GIE Bicycle Mobile. The antenna shown is for 2 metres. The 20M Hustler is normally mounted on a bracket on the end of the parcel carrier.



Magnetic Loop Antenna

TECHNICALITIES

COMPILED AND CONDUCTED BY ROGER HARRISON, VK2ZTB

THIS COLUMN IS DEDICATED to disseminating practical, do-it-yourself hints, tips and techniques for the amateur interested in experimenting, tinkering and homebrewing — the "Saturday arvo solderer rules, OK!"

Variable Ceramic Resonator Ceramics

I've always found the long-running "Technical Topics" column conducted by Pat Hawker G3VA in the RSGB's *Radio Communication*, an absolute gold-mine of material over the years. I guess many other amateurs have, too. So you can expect me to extract items from it on a fairly regular basis; he extracts plenty of items from our own *AR* anyway!

An item that caught my attention in the February '91 issue of *RadCom (p 30)* was on variable ceramic-resonator oscillators. Ceramic resonators are low-cost piezoelectric devices having characteristics between an LC circuit and a quartz crystal. They look not unlike a ceramic capacitor and are widely used in TV colour burst oscillator applications (3.58 MHz and 4.43 MHz), video games and computers. Their Q and stability is better than an LC circuit, but somewhat less than a crystal. They are considerably cheaper than quartz crystals. Many electronics retailers in Australia carry them.

As with crystals, you can "pull" a ceramic resonator's frequency using a variable capacitance in an oscillator circuit. As it turns out, you can pull the frequency much more than with a quartz crystal of a similar frequency. Obviously, a ceramic resonator could be used in VFO applications.

Hawker reports on the work of John Townend G3BBD with a variable ceramic-resonator oscillator. The general idea is shown in Figure 1. He used a 3.58 MHz ceramic resonator, gaining a variable frequency range of some 70 kHz, stretching from 3.522 to 3.590 MHz, which readers will note neatly covers the Australian Novice segment on the 80 metre band

The circuit uses one inverter stage from a 4069 CMOS hex inverter IC, in a Pierce oscillator arrangement. A 375 pF variable capacitor (e.g: a broadcast tuning gang) provides the frequency shift. Townend reports that the arrangement gives good frequency stability provided that the temperature remains reasonably constant.

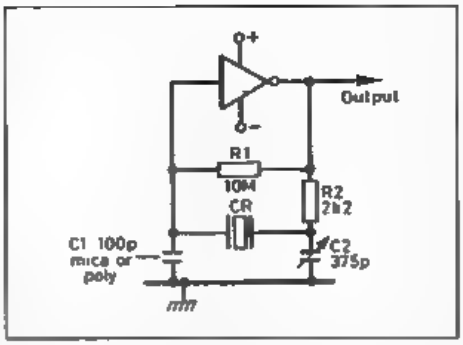


Figure 1. You can make a tolerably good variable frequency oscillator for the 80 metre Australian Novice band by "pulling" the frequency of a 3.58 MHz ceramic resonator oscillator, as reported by G3BBD. The active device is one inverter from a 4069. CR is the ceramic resonator. About 70 kHz shift is obtained, much greater than can be achieved with a comparatively expensive quartz crystal. Good frequency stability is obtained without special efforts, provided the temperature remains reasonably constant.

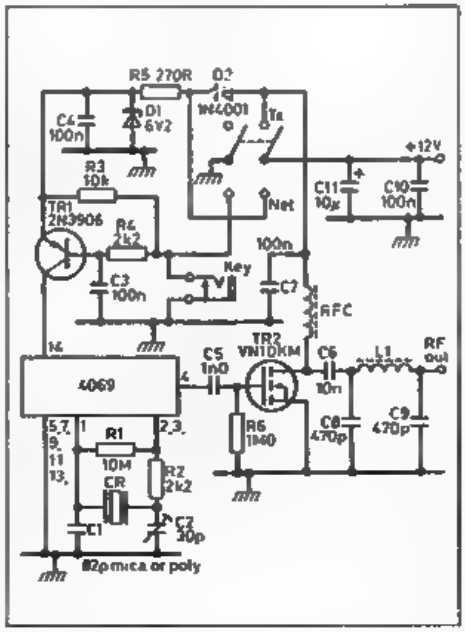


Figure 2. Example of an 80 metre QRP transmitter, built by G3BBD, using the ceramic resonator variable oscillator of Figure 1. It covers about 3520 to 3590 kHz.

Townend's circuit of a QRP 80 metre transmitter is given in Figure 2 The 4069's power supply pin is keyed to provide full break-in operation. Another inverter in the 4069 (pins 3-4) is used to buffer the oscillator stage (pins 1-2). TR1 could be a BC557. I think C2 is incorrectly labelled "30p", it should be a 375p variable capacitor.

The VN10KM provides an output of a little over one watt, Townend claims. "Construction is extremely simple and, provided care is taken to ensure a reasonably constant temperature around the oscillator, temperature drift is minimal. In practice it was found to be less than 200 Hz during the course of a 30-minute QSO," he reported.

I might add that the idea could certainly be used in a receiver, too.

General-purpose RF preamp

For any RF enthusiast, a "general purpose" wideband RF amp with 50 Ohm inputs and outputs is a most useful device. I noticed a neat and simple circuit in an article by the indefatigable Doug DeMaw W1FB in the January '91 issue of *QST*. The article's entitled "A Diode-Switched Band-Pass Filter". Filters are naturally lossy and hence his project includes an RF amp to compensate.

While the project shows a bipolar transistor RF amp stage, Doug says the bipolar transistor is a little noisy for use in receiver front end applications and suggests the use of a common-gate JFET stage, as reproduced here in Figure 3.

Input and output are matched using broadband RF transformers wound on Amidon toroids (available from RJ & US Imports, who advertise in Hamads each month, and also from Stewart Electronics). T1 is 4:1, T2 is 10:1 (contrary to what it says on the circuit). Winding details are given in the caption. All capacitors are disc ceramic types and the resistors are 1/4-watt carbon film or carbon composition types. Stage gain is around 10-11 dB and the circuit configuration results in a stable amplifier.

Having 50 Ohm input and output impedance allows you to "insert" the amp in front of a receiver or frequency counter, for example, to boost sensitivity, or at the output of an oscillator to provide buffering and boost the output level.

This circuit should work over the range from the lower HF region (1.8 MHz) through to the lower VHF region (60-80 MHz).

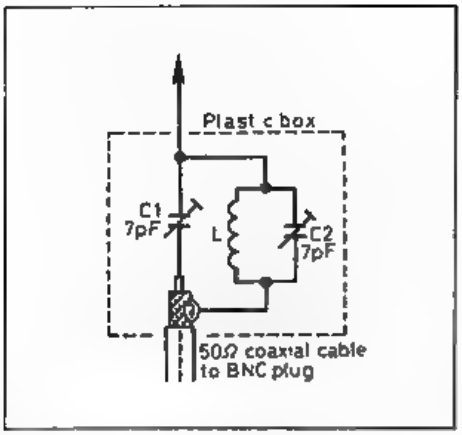


Figure 4. End-fed 2m antenna and matching section, by H-J Brandt DJ1ZB. The 7 pF trimmers should be high quality VHF/UHF types; Brandt used air-spaced trimmers from Tronser. Try Stewart Electronic Components for something suitable. The coil is 5 turns of tinned copper wire (gauge not specified, but 18g would do), wound on a 5 mm former and slipped off then pulled or squeezed to a length of 8 mm. If C2 has to be set at either end of its range, vary the coil by squeezing (C2 at min.) or opening (C2 at max.) the coil.

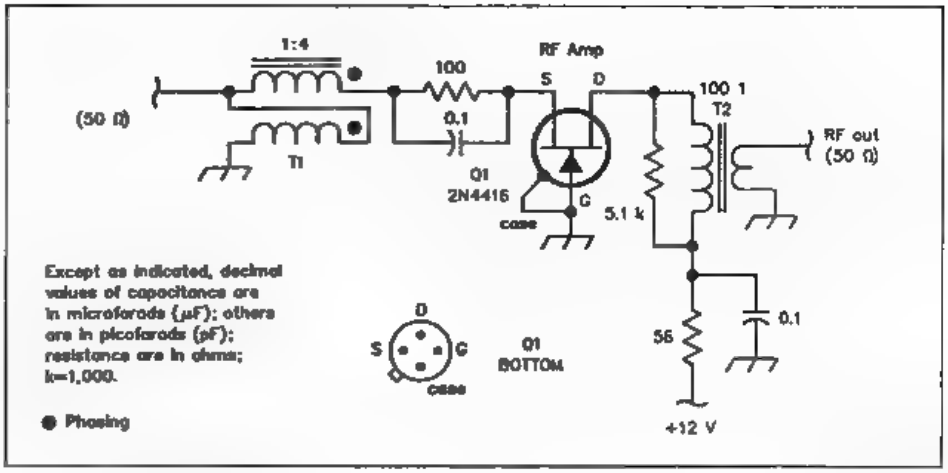


Figure 3. General purpose, wideband RF amplifier, from a project by Doug DeMaw W1FB. T1: wind 15 turns, bifilar, of no.28 enamelled copper wire on an Amidon FT37-42 ferrite toroid. The spots indicate the start (or finish) of each winding. In other words, you connect them "in series". T2: primary is 30 turns of no.28 enamelled copper wire wound on an Amidon FT50-43 ferrite toroid; secondary is three turns of the same wire.

Construction should be fairly non-critical, but keep all component and connecting leads as short as practicable; use good RF construction practices.

End-fed antenna for 2m handhelds

The ubiquitous "rubber ducky" flexible whip for two-metre handhelds are anything but efficient. Convenient in a physical sense, yes; efficient, no. In Technical Topics in the January '91 issue of RadCom, Pat Hawker published a letter from HJ Brandt DJ1ZB, who sent in a 1985 article of his from the German *Funk* magazine on an end-fed 2m antenna.

Brandt showed that his antenna design gave an improvement of at least 9 dB over a rubber duck antenna, enabling him to access repeaters with his handheld switched to 300 milliwatts where he had to use the rig's full 2.5 watts with the rubber duck antenna. Not bad!

His end-fed antenna employs a telescopic whip or rod of 80 to 133 cm, with a matching network enclosed in a small plastic box at the base. (He used a 57 x 28 x 28 mm box).

The arrangement is shown in Figure 4. A flange or bulkhead type BNC plug mounted on the box allows the antenna to be mounted directly on the rig. Or, it can be mounted separately and connected to the transceiver by a length of low loss 50 ohm coax.

The matching section capacitors are adjusted for peak field strength at minimum SWR. The longer the whip, the more "gain" you get, compared to a rubber duck. Brandt reports a whip length of 90 cm gave 7-11 dB improvement, while 116 cm gave an improvement of 11-15 dB.

Anniversary Contest

An expedition devoted to the 500th anniversary of Zaporozhye Cossacks is planned for 21 to 28 July 1991. Expected callsigns:

RY1QH	-	ial. Khortisa, Zaporozhye Sech
RY2QT	-	Tomakovka Sech
RY3QB	-	Bazaluk Sech
RY4QM	-	Mikytin Sech
RY5QC	-	Chortomlyk Sech
RY6QO	-	Oleshkov Sech
RY7QK	-	Kamenska Sech
RY8QN	-	Now Sech
RY0QQ	-	base station, Tokmak

Operation will be on all HF and VHF bands, SSB and CW; RTTY in some instances.

To receive the Award, five QSOs for Europe, three QSOs for DX are required. The cost is five IRCs.

QSL via UB0QZ, Valentin Dolinny, PO Box 4900, Zaporozhye, 330076, USSR.

Technical Correspondence

Programs Vs Know-how

TECHNICAL WRITINGS ABOUT aerial wires and rods for the reception and transmission of radio waves are referring more frequently to computer programs which calculate aerial characteristics. The name of the program is "dropped" authoritatively and with awe to impress the reader that the results are the last word and brook no argument.

That philosophy discourages self-training and technical investigation by giving the impression that the knowledge is locked away in an exclusive possession of the author. As Lady Lovelace said about the Babbage "engine" - "It has no pretensions whatever to originate anything. It can do whatever we know-how to order it to perform."

The "know-how" comes only with understanding and, to paraphrase Lord Rutherford - "If you can't understand the theory maths you can't understand." A computer program is not a substitute for understanding.

My first experience of a program for calculating aerial characteristics dates to the mid '70s. A writer quoted computer calculated characteristics of Quad aerials. The results could not be supported by applied array theory; the programmer's know-how was incomplete.

On the subject of that often repeated "soapie" quads versus Yagi - will someone prove, with documented array theory, the truth or otherwise of the following:

(i) the gain of an isolated element of a square loop Quad is the same as the gain of an isolated half-wave dipole; both referred to the field from an isotropic source;

(ii) the addition of parasitic elements to a Quad produces the same gain improvement as the addition of similarly spaced and tuned parasitics to a half-wave dipole;

(iii) the presence of ground has the same effect on both arrays.

The proof can be arrived at almost intuitively, but added mathematical analysis makes it more convincing. Quoting "Annie" or "Minimec3" calculations as proof demands too much credulity.

LINDSAY LAWLESS VK3ANJ
BOX 112, LAKES ENTRANCE 3909

The direction of amateur techniques

The current province for the amateur is in single-channel specialities, whether it be Rx, Tx, antenna or mode. The versatility of modern multi-band equipment guarantees that compromises - many of them - have been made. Likewise, multi-band antennas can seldom, if ever, combine optimum bandwidth, gain, vertical angle and front-to-back ratio. Single-frequency antennas can be optimised or have one facet emphasised, with a reasonable chance of success.

Over the past decade the development of VHF and UHF equipment was assisted by their being single-band units Only recently has two-band equipment of comparable ability appeared in the marketplace. The message is clear - if you want to be a front runner, pick a band and have a go.

Long distance high speed commercial links use diverse reception, where multiple antennas each feed a separate receiver and the outputs are combined or selected for the best signal result. An amateur, struggling to get some sky-wire up, can reasonable ignore this, or can he? Loops, ferrite rods and active antennas do not take up much room, even in a unit! Solid-state mono-band receivers now fit into a small die-cast box, and switching circuits can operate so that high-speed sampling for the best signal is possible.

There are convenient packages to count 16 cycles and then sample the next source. On 1.6MHz this is a 10 micro-second sample, fast enough to select the best components of the signals and combine them for the enhanced performance of ALL pulse systems. This is an avenue for all operators to explore for that QSA5 signal.

ROBERT R MCGREGOR VK3XZ
2 WILTSHIRE DRIVE, SOMERVILLE 3912

ar

TRY THIS

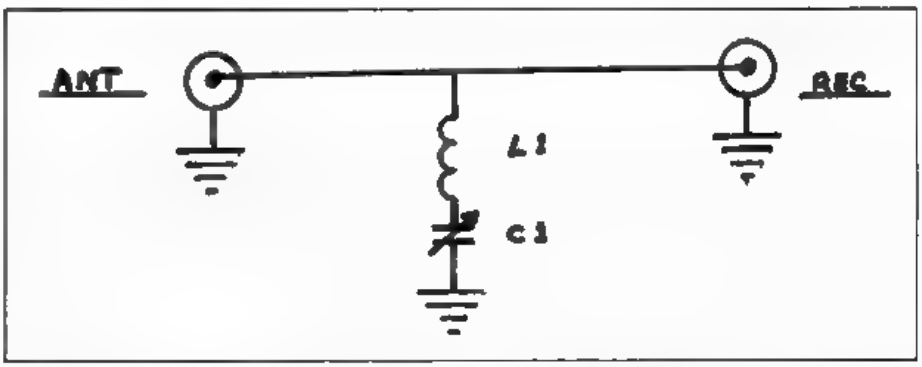
Image Tester

Have you ever wondered if you are actually listening to intruders in our bands or are you listening to an image. There is a useful low-cost gadget to determine if you are listening to an image or not.

The idea is to insert a calibrated series tuned trap into the antenna line to the receiver and to tune the trap across the band, if the image is reduced or disappears when tuned to other than the frequency of the receiver, the signal is an image.

C1 100 or 150PF variable
L1 8 turns 22SWG 1¼ diam
and 5 turns 22SWG 1¼ diam
plus in coils

Range 5MHz-15MHz approx
and 13MHz-23MHz



To Calibrate:

Connect as shown in diagram 1. Couple GDO to L1, tune C1 for null and mark dial. Note: varying coupling may change calibration point slightly; couple loosely if possible.

This idea was suggested by Dan W8ZCO way back in 1967.

Thought you may like to try this simple circuit one rainy weekend.

Bob Tait VK3ERG ar

The Balloon Goes Up!

GEOFF ATKINSON VK3YFA
35 BERRINGA RD, NORTH RINGWOOD 3134

FROM AN IDEA BROUGHT TO the committee of the Eastern & Mountain District Radio Club Inc by a member, Joe Magee VK3BKI, who was then to become the Project Co-ordinator, a very successful day was held on 11 May 1991. The club launched a meteorological balloon carrying a modified Philips radiosonde to record and transmit temperature data via a homebrew 2m transmitter on the "foxhunters" frequency of 144.250MHz.

The balloon was launched from the club's new premises at the Knox Boat Fishing Club rooms at the Schultz Reserve in Wantirna (Melway 63K6) at 1114 hours EST after a minor delay caused by insufficient lift being available from one balloon. A second balloon was quickly inflated and attached to the original and liftoff was achieved without further incident. The balloons are inflated to approximately 1.2m in diameter for the launch, but expand during ascent to reach approximately 8m before exploding and sending the payload back to earth in the care of the parachute (not packed like a skydiver's chute!!).

The weather was overcast and drizzling, but this did not stop a large group of club members, other amateurs and approximately 160 interested members of the public from attending this unique event in the suburbs. KZ-FM included news of the launch in its 10am news broadcast, and this along with news promulgated on numerous bulletin boards and by the amateur "grapevine" alerted a very large number of people to the event and resulted in its ultimate success. The balloon was visible for about 1000 feet after liftoff and then was lost in the clouds and we relied entirely on signal reports and beam headings being reported on the four net frequencies manned by enthusiasts. Along with the reports from base and mobile stations, we were fortunate to also receive information from Melbourne Radar at Tullamarine Airport as to the direction of travel and range of the balloon. It was carrying a radar reflector which provided adequate capture area for the radar.

Needless to say, this is not the sort of project that can be conceived and put into effect immediately. Great encouragement was received from the Bureau of Meteorology, which also donated the two balloons, and Joe was able to obtain much valuable technical data from them to assist the project. Liaison also had to be effected with the Department of Aviation to ensure the balloon did not lift off in the path of a Jumbo, or be responsible for a nasty incident. Clearance was obtained via a car phone (wonder device) and so we proceeded with the launch.

Photo showing balloon, parachute, radar reflector and transmitter/sensor. Photo by David Nisbet VK3XDA.

Reports from the Met Bureau's two earlier launches on Saturday indicated that the wind was from the south-west and therefore the balloon would head off in a north-easterly direction towards Yarra Glen or maybe further.

The project was of great interest to a special group of amateurs commonly known as "foxhunters", as normally their "fox" is limited in how far he can go or get off the ground, so a new challenge became available and it was taken up with great enthusiasm by many teams.

Signal reports were many and varied, and a total of some 760 reports was logged, with calls coming from VK1, 2, 3, 4 port 5, 5 and 7, which was a most pleasing result.

The balloon rose to approximately 16,000m (16km) (50,000 feet) before it began its descent phase, and the foxhunters were doing well in their pursuit of the payload.

As part of the preparation, two computer programs were written to provide information on the balloon heading and also to decode the transmitted signal for analysis of the temperature data. A final assessment has yet to be carried out. The payload eventually returned to earth (almost; it got stuck in a tree) and was located by Ian VK3YQN from the Healesville Amateur Radio Club, who will be rewarded for the successful return of the payload to the club. VK3BMV Ewen actually climbed the tree to retrieve the load. It is interesting to note that three foxhunting teams arrived within about 10 minutes of each other. The balloon payload came down at Snobs Creek, near Lake Eildon, a distance of 54 miles, or 87 kilometres from Wantirna, and total elapsed time from liftoff to recovery was four hours and one minute.

The project was photographically recorded as well as videoed to ensure a record of the event is maintained.

A special certificate is being presented to stations which respond with signal reports and $5 to Box 87, Mitcham 3132, as well as a QSL card to acknowledge participation in the event.

As a club we could not have achieved the great results we did without support of a large number of people, as well as some commercial sponsors, namely Philips Communications Systems, Bright Star Crystals, Monash University for the loan of the balloon launcher, Powerhouse Electronics for the special battery pack used to power the transmitter, and Baker Radio for technical assistance.

Needless to say, plans are being formulated for another balloon launch, but this time with a different payload. ar

Youyi Wansui — Long Live Friendship

友谊万岁！

WALLY WATKINS VK4DO
PO Box 262
AIRLIE BEACH 4802

IT WAS A GREAT HONOUR FOR the Wireless Institute of Australia and myself to be invited to China by the Chinese Radio Sports Association to give a series of lectures to amateur radio clubs in Beijing and Nanjing. As we understand, this is the first tour of its kind by a Western amateur to new China.

Preliminary discussions were held during the 1985 IARU region III conference with Deputy Secretary General Wang Xun. Further talks were held during my later visits to Beijing in 1987 and 1988.

The main thrust of the lectures was the explanation of the relationship between the Department of Communications and the Wireless Institute of Australia, the syllabus and conduct of examinations, together with the development of amateur radio clubs in Australia. Some of the lectures were for non-amateurs, so time was spent explaining "what is amateur radio" and the benefits to the individual and international understanding. An explanation of IARU and the orderly development of amateur radio throughout the world was also covered.

Time was taken to visit BY1BH, BY1SK, BY1QH and BY1BJ where old friends greeted me and general discussions took place.

At BY1BH, part of a special school, the Dean extended a warm welcome and told that they supported 34 activities amongst 300 students. There are 10 departments, including technology, art and sport as well as a library. The school has government finance and is open six days per week (not Monday) particularly during afternoons and early evenings.

Sections visited were computing, technology, choral and Beijing opera. Students at the technology section were making printed circuit boards with a sharp knife instead of etchant. They would welcome old PC boards for parts, as their supply is not great.

The students for these special schools are selected by primary and middle school teachers because they show a budding expertise in a particular field. This is developed and usually leads to majoring in that field at university.

Director Huang at BY1SK explained that his station is part of the science and technology club and promotes the construction of equipment. The students are involved in community work in their spare time, serving the people and making no charge for repairs to electrical and electronic appliances. The 400 students' ages range from 12-17 years and they are supervised by 40 teachers. Huang is a ham and hopes to have a 2m repeater operating soon.

The Qinghua University station, BY1QH, has 10 students and is experiment oriented. Only a general discussion took place as there was no power that day for their area.

At BY1BH, manager Wang was interested in getting details of simple 2m equipment, and a fine discussion took place with students about the Australian way of life.

Two days of lectures took place at BY1PK for officials of the Chinese Radio Sports Association and station managers from Beijing stations. This was followed by two very busy days operating in the CQ WPX contest. (See *AR* July 90, p24. Ed).

Travel to Nanjing was in a no-frills, one-class 727 of CAAC. Refreshments for the 1.5-hour flight were a can of beer and a packet of nuts.

A particularly warm welcome awaited us in Nanjing, led by Chen BZ4RC, the secretary of Jiangsu branch of CRSA and several others from the Jiangsu sports commission and the South-east University of Nanjing. The following evening a special banquet was given in my honour where gifts were exchanged and then it was back to business. Accommodation was at the guest house at the South-east University

A visit to a special school for fox-hunting was next on the agenda. A briefing by director Zhu was followed by an inspection of the facilities. As well as radio direction finding they teach small-bore rifle/pistol, skeet, air-rifle/pistol as well as flying model aircraft, both radio and wire line controlled.

About 30 pupils are at the school at one time for a particular activity. They spend 6-12 months there doing normal studies in the morning and training in the afternoon, plus school studies in the evening. Students are selected from 11 cities in the Jiangsu Province. Radio direction finding on 80 and two metres is a middle school activity, while 160 metres is a hobby activity for primary schools.

RDF adheres strictly to international rules. Although commercial equipment is available, homebrew RDF gear is encouraged.

Group at fox hunting school Nanjing

RDF is a time trial with contestants leaving at five-minute intervals. Adult courses are over seven kilometres with transmitter powers between 0 5 and 5.0 watts Five transmitters are on the same frequency with differing CW idents, with the home station on a different frequency. As proof of finding the transmitter each contestant marks his card with a stamp tied to each transmitter.

An open invitation was given to me to attend the school for RDF training along with other VK amateurs who may be interested in taking part in international competition which will be held in China in 1992. After watching a demonstration by the students over rather rough terrain in a forest park on the outskirts of Nanjing, I think that if I ever partake of international RDF then it will definitely be in the OM section.

While at the South-east University, time was spent in "free talks" with various students including Xu whom I had previously contacted on 15 metres from Australia

The visit to No 51 Middle School was arranged to promote a greater interest in amateur radio, as most of the students were active in RDF. The school has done very well by taking out championships in 1981, 83, '86 and '89. Principal Wu stated that the after-school activity, including construction, has greatly improved the students' understanding of physics. Many students have graduated into military radar units with distinction. RDF is an ongoing activity supported by the Physical Culture and Sports Commission of Jiangsu Province The school then gave a display of RDF on 160 metres and showed a video of its activities at a national test. These activities are strongly supported by the Education Board. As well, the students learn Morse. The RDF test on 160 metres in 1988 was over four days and there was fierce competition from 200 athletes.

Another lecture was attended by 16 coaches from stations around Jiangsu Province and included Jiang from Suzhou who was very proud to have worked VK3OT on 50MHz CW. A good question time followed this session.

The biggest audience was at the South-east University. Prior notice was given through wall hangings at the main entrance for several days. Over 120 people turned up and listened with great attention.

In my spare time of a morning, one of the members of BY4WNG, Ni, arranged for a loan of a bicycle for me and we spent some time exploring various spots of interest around Nanjing. Bicycle riding in China is quite an experience. One does not see too much while riding as there are so many other vehicles around that one must concentrate on not having an accident.

2m fox hanging in a tree

Once again at No 33 Middle School enthusiasm was shown by 100 students and teachers with good questions after the lecture.

At this school there are 850 students, 20 classes — 14 being junior and six senior — with 110 teachers. Spare-time study by 80 per cent of the students in 27 groups is undertaken in such fields as physics, culture and chemistry to name but a few. Fox hunting is enjoyed by the students who have also done well in provincial and national competitions.

The final lecture was at BY4RSA, the official station of the Jiangsu branch of CRSA, before 60 members. Question time was a lively affair as half the members spoke a little English, and at times subjects ranged well away from amateur radio. After the discussion I made a mistake by giving one young girl my autograph in both Chinese and English, together with my address. What I did not realise was that another 25 wanted the same! After discussion with manager Chen Fan, an agreement was reached for BY4RSA to become a sister club of VK4WIT, the Townsville Amateur Radio Club.

On the last Sunday it had been arranged for me to visit the Nanjing radio factory in the morning. Wang arrived at 0830 and told me that the visit was off as a top-level delegation from Beijing had arrived unexpectedly and our visit would be inconvenient for the factory management, so off we went in the car with some talk of visiting a monastery. Ten minutes later we drove through some gates and, lo and behold, it was the Nanjing radio factory! Wang smiled and said in a quiet voice, "April Fool, Wally " Yes, it was 1 April!

The next day I was to leave Nanjing in order to go to the city of Changsha in Hunan Province, where I was to visit with some old friends. Chen and Wang left me at the airport at 1500 in time to catch a flight at 1530. As it was necessary to proceed through security, Chen and Wang left. However, departure was rescheduled for 1700. Right on the dot the flight crew went out to the Antonov 24, then at 1730, after an announcement over the loudspeaker, everybody went away, including the flight crew. So, putting on my best Beijing accent, I approached the front counter and found out that I should come back tomorrow at 0830!

So, without luggage, I went out to the front of the air terminal and was lucky enough to find a taxi from the Jingling Hotel, where I stayed overnight, and completed my journey to Changsha the next day, but that is another story.

The co-operation and support given to me by the Chinese Radio Sports Association in Beijing, the Jiangsu Province Sports Commission, and individual clubs in Beijing and Nanjing, were most appreciated. Special thanks go to my old friend Wang Xun, and Liu Deputy Secretaries-General of CRSA, Tong, Station Manager of BY1PK, Chen, Station Manager of BY4RSA.

Without my other two good friends Meng Chao BZ1FB and Wang, my lectures would have been impossible. The patience and understanding of technical terms showed their excellence as interpreters. In fact, after only four lectures, Wang did not really need me!

So, to all my old and new friends in China — Zaijian. **ar**

Have you advised the WIA Executive Office of your new callsign? Use the form on the reverse of the *Amateur Radio* address flysheet

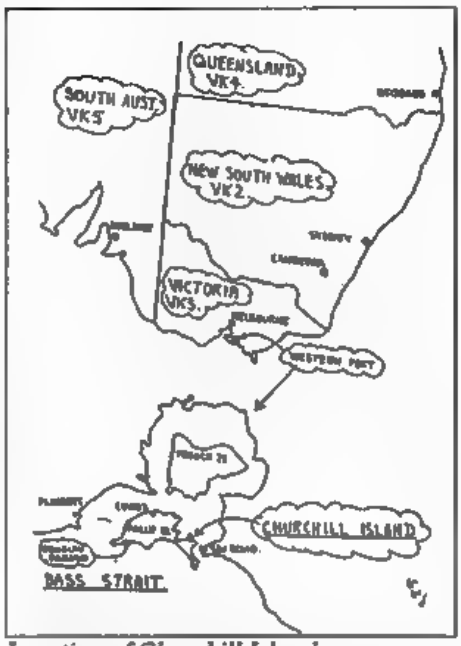
Churchill Island and Amateur Radio

DES GREENHAM VK3CO
16 CLYDESDALE COURT, MOOROOPNA 3629

AFTER VISITING CHURCHILL Island recently, we were most impressed with the restoration and careful management of the island and homestead. Many will no doubt be saying "Where is Churchill Island and what is its association with amateur radio?" Churchill Island is in Victoria and is just inside Western Port Bay, adjacent to Phillip Island, now internationally famous for the "Penguin Parade" each evening (see attached map).

The island was originally discovered by George Bass in 1798 during one of his many voyages around the south coast of Australia. As a result of Bass' venture, Governor Hunter despatched Flinders with the sloop "Norfolk" to prove once and for all the existence of the stretch of water we now know as Bass Strait. Having proven the existence of Bass Strait, further exploration was planned and Lt Grant, in a 60-ton sloop named "Lady Nelson", was sent to further explore "Western Port" in 1801. He came into the port and made several landings one of which was on a small island which he subsequently named after Mr Churchill, a farmer in Devon who had given him some seeds and vegetables to plant somewhere in the "new land". Grant chose Churchill Island to plant the seeds etc. He felled numerous trees and formed a garden. With easy soil to dig, he planted wheat, corn, peas, rice, coffee, berries and potatoes. He also planted stones and kernels of several fruits he had on board, not forgetting apples. Grant then returned to England and may never have learned the success or otherwise of his planting. A year or so later, Lt Murray returned to Bass Strait and called into Churchill Island to find wheat and corn growing two metres tall! He also found onions and other produce growing.

This is the earliest history of Churchill Island. In 1857, an English migrant landed there and set up his home. He and several other farmers successively cultivated and developed the island until more recent times. In 1936, Dr Harry Jenkins, a Melbourne dentist, bought the island primarily for his son, Edward, who held an amateur licence and the callsign VK3QK. Ted, as he was more commonly known, had, as a result of a diving accident, become a paraplegic. Ted operated his station from his wheelchair, and was a well-known operator on the air waves. He operated from Elwood, a Melbourne suburb, and from Churchill Island, where he had an extensive antenna farm. To care for Ted, his father engaged Sister Campbell, who was with him continually, including his frequent visits to the island.



Location of Churchill Island

During the years I knew Ted personally, he frequently told me about the island. He also related the story of an old cannon set up in the garden on the island. This cannon, dated 1863, was originally installed on an American Confederate vessel, the "Sea King" which visited Melbourne in 1865 seeking provisions. The ship's commander, Lt Waddell, presented the cannon and a stock of cannon balls to Melbourne councillor, Mr Samual Amess who was, at that time, the owner of Churchill Island. The cannon was set up on the island and remains there to this day. In the early post-war years, Ted and his family made a ritual firing of the cannon on every New Year's Eve to celebrate the forthcoming year. At that time, Ted told me he had enough stock of cannon balls for the next century! Sadly, Ted died in 1960, and his father died later in 1963. Dr Jenkins bequeathed the estate to Sister Campbell who had been a companion and help to Ted during his short unfortunate life. Sister Campbell continued the farming activities on the island until 1973 when, due to ill-health, she made the decision to sell the island. It was purchased by Mr Classou and, more recently in 1976, the island was purchased by the Victorian Conservation Trust at a price of $400,000

The original homestead has been restored for tourists, and more restoration is current. The garden still retains its original beauty, and the old cannon is firmly in place although it is a long time since it was last fired, the New Year's Eve ritual being dropped after Ted's death.

Today, there is nothing left of Ted's radio activities on the island; his antennas have all disappeared, and there is no evidence of his "shack". Ted was a well-known amateur in the post-war era and was an inspiration to many other people to "go for a licence". Some of Ted's influence spread to nearby San Remo, where a young man interested in radio subsequently became VK3BWD and is now our VK3 Federal Councillor.

The island is now an increasingly popular tourist attraction with a vehicular access bridge. Tourists from all parts of the world now see how life was on Churchill Island but, sadly, there is no reference at all to the part played by the late Ted Jenkins VK3QK.

VNG News

MARION LEIBA VK1VNG, VK1BNG

ON 1 MAY 1991, AUSTRALIA'S standard frequency and time signal service, VNG, was issued a licence on 12.984MHz. This frequency is on loan from the Royal Australian Navy and we are most grateful to them.

The transmission on 12.984MHz will be double sideband at 10kW power, but with the bandwidth restricted to 3kHz at the Navy's request. Also, VNG is not permitted to transmit voice on this frequency, but the letters "VNG" will be in Morse.

The frequency synthesiser for the 12.984MHz broadcast is being built in the Geology Department of the University of Tasmania in Hobart by Vagn Jensen VK7VJ.

The 12 984MHz transmission is expected to commence around the end of June. Until then, the five and 10MHz transmissions will continue as before, and 16MHz will be broadcast from 2200-1100 UTC each day.

VNG Facts

Location: International Transmitting Station, Civil Aviation Authority, Llandilo, New South Wales, Australia, 33°41'52"S, 150°47'33"E

Transmitters: STC HF broadcast transmitters, 10kW carrier power

Emission: Double-sideband full-carrier amplitude modulated telephony

Aerials: Wells quadrants

Temporary Transmission Schedule:

5MHz: continuous

10MHz: 2200-0700 UTC — No time pips during 9th, 10th and 11th minutes, and from 46th to 52nd minute inclusive on 10MHz only. Carrier continues uninterrupted.

16MHz: 2200-1100 UTC

Voice Station Identification

Announcement:

Given during the 15th, 30th, 45th and 60th minutes without interruption to the time signals. The speech is "notched" to allow seconds markers to continue and has special components around 1000Hz removed to avoid erroneous operation of tuned relay time circuits. The text of the normal announcement is:

"This is VNG, Llandilo, New South Wales, Australia, on 5, 10 or 16 Megahertz. VNG is an Australian standard frequency and time signal service. Enquiries may be directed to:

VNG Users Consortium, GPO Box 1090 Canberra, ACT, Australia 2601

Time Code: The time code format was published in *AR* in December 1990 (p 26)

ar

Book Review

QTC (I HAVE A MESSAGE FOR YOU)
IAN CROMPTON VK5KIC,
9 CRAIG ST, RICHMOND 5053

A BOOK ABOUT HISTORY OF radio and the place and function of CW in that history? Well, be fair, reviewer, the place and function of CW in one phase of that history.

Interesting history, including references to matters hidden under the Official Secrets Act of one country or another until this sort of historical material, 30 years and more out of date, became archival, and therefore publicly available.

A book by a ship's radio officer (retired) Looking at SOS or XXX calling procedures and at several SOS situations. Looking at considerable length at some of the theories proposed in court, and in one book or TV spectacular or another, about the sinking of the "Titanic". Expressing a viewpoint on practicality born of experience at sea in a position where a rescue, achieved or not, could at ANY time start only hours away.

And expressing the thought that massive disaster becomes probable as soon as there ceases to be an emergency calling procedure independent of power from the ship's engines. As soon as obligatory watch procedures on the single worldwide frequency of 500kHz ceases in 1999.

This silence and listening on 500kHz is on three minutes twice each hour, and by alarms triggered by an obligatory procedure before putting out an XXX or SOS call. Alarms are switched on whenever the operator leaves the shack. This will cease when UHF, VHF on several frequencies, and satellite operations, all basically voice, with the intelligibility problems related, replace this procedure on one frequency.

Well written, I feel, well enough for me to have read it in one session of four hours.

Title. *QTC (I have a message for you)*, by "Sparks", whose name appears only in one page in the book. Wonder whether you will find it?

Publisher: Sequoia Press TX, 2502 Cockburn Drive, Austin, Texas 78745, United States of America. ar

WIA News: From page 6

transmission lines and a single wire quadrant aerial. The present 16 MHz (formerly 15 MHz) transmitter will be used for 12.984 MHz and the current 16 MHz quadrant will be modified for this purpose. The present 10 MHz transmitter will be used for 8.638 MHz with a spare single wire quadrant which will be remade. The 5 MHz transmitter and Wells quadrant aerial will remain as is.

If there are no problems with completing the line work, we hope to start transmitting on 8.638 and 12.984 MHz at 0000 UTC on 3 July 1991.

Please note that transmission on 10 MHZ is expected to cease at 0700 UTC on 2 July 1991.

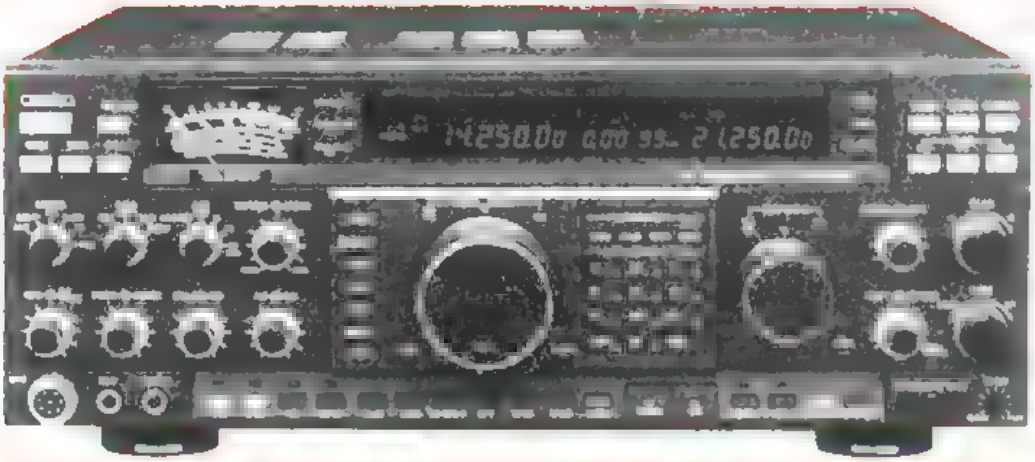
From 3 July 1991, all going well, VNG's new transmission schedule will be :-

5.000 MHz, 8.638 MHz, 12.984 MHz : continuous 16.000 MHz: from 2200 - 0500 UTC.

Thanks to Ron Henderson VK1RH, David Wardlaw VK3ADW and Brenda Edmonds VK3KT for their invaluable assistance with this month's news.

Bill Roper VK3ARZ

DON'T BELIEVE US?



"The Best of the Best!"... That's what Yaesu and Dick Smith Electronics think of the FT-1000 deluxe HF all-mode transceiver. But don't believe us- read what the experts have to say...

On documentation

'clearly written and complete, and includes a complete set of schematics and many high quality photos" — QST
' The quality of printing and presentation of this book is the best I have seen .. ' — AR

On operation

"The layout of the front panel of the FT-1000 is just right... I reckon the FT-1000 is (operationally) far less complex than either the Icom IC-781 or the Kenwood TS-950S." — ARA
'..I found the FT-1000 easier to learn and use than any other radio in its class ' — QST

On the receiver

'On receive the performance was often beyond the limit of the latest professional measuring equipment, with no measurable trace whatsoever of synthesizer phase noise " — PW ' ..this rig has a very strong receiver; it has the best overall performance (in terms of sensitivity and dynamic range) and the highest third order input intercept of any commercial radio ever tested in the ARRL lab." — QST*
The direct digital synthesizer works very well and produces receiver performance that sets new standards." — AR
'I found the receiver in the FT-1000 to be astonishingly sensitive and immune to cross modulation on all bands." — ARA

Transmitter — SSB

"In SSB operation the FT-1000 is easy to adjust and use.. The processor adds quite a bit of punch to SSB signals, hams I worked on SSB with the FT-1000 gave me good audio quality reports ' — QST "Reports were all very favourable, especially when using the speech processor." — AR
' reports of my transmitted audio were very good, even with the RF processor turned up .." — PW

Transmitter — CW

'CW keying was a delight power output was checked in the CW mode and found to be well in excess of 200 watts on all bands. ' — AR 'On CW the FT-1000 was absolutely faultless. ' — ARA "CW operation with the internal keyer is a breeze In QSK CW operation, the rig has well shaped and weighted keying." — QST

Transmitter — RTTY/Packet

"Using the set on HF packet was an absolute pleasure..." — PW "RTTY and packet radio operation with the '1000 are straight forward..." — QST "Packet and RTTY modes were tried and proved just superb." — ARA

Conclusion

"Yaesu's latest 'Flagship' transceiver clearly lives up to its name..." — PW "..the FT-1000 represents unbeatable value..' — AR "It is an excellent set worthy of accolades and rave " — ARA "...the FT-1000 needs little for me to consider it the ultimate contesting and DXing machine available today.. " — QST*

The FT-1000's combination of Direct Digital Synthesis, high output power, ultra-high performance receiver, and easy to use controls put it far ahead of the competition. Wouldn't you rather be using the "Best of the Best' ?

Cat D-3200

2 YEAR WARRANTY

$4995

including MD-1 desk mic

Magazines
ARA — Amateur Radio Action Vol. 13, No. 2
AR — Amateur Radio August 1990
PW — Practical Wireless January 1990
QST — ARRL QST March 1991 *(review with optional filters fitted)
Copies of these and other reviews plus our 12 page colour brochure are available upon request. Phone (008) 226610 or (02) 8882105.

DICK SMITH ELECTRONICS

B1158

Serious Amateurs Deal With The Professionals

VHF/UHF BASE STATION ANTENNAS

These high quality vertically polarised base station antennas are ideal for the discerning Amateur operating on the 2m, 70cm or 23cm bands. They're beautifully constructed Diamond brand antennas from Japan and provide high gain for maximum range. Constructed from robust F.R.P. tubing for excellent all-weather operation, with ground-plane radials for a clean radiation pattern.

2m ANTENNA F23A

Frequency 144 — 148MHz
Gain 7.8dB
Max. Power 200W
Max. Wind Speed 144km/h
Length 4.53m
Type 3 x 5/8λ co-linear
Cat D-4850

$199

2m/70cm ANTENNA X-200A

Frequency 144 — 148MHz, 430 — 450MHz
Gain 6dB on 2m, 8dB on 70cm
Max. Power 200W
Max. Wind Speed 180km/h
Length 2.5m
Type 2 x 5/8λ(2m), 4 x 5/8λ(70cm)
Cat D-4860

$199

23cm ANTENNA F-1230A

Frequency 1260 — 1300MHz
Gain 13.5dBi
Max. Power 100W
Max. Wind Speed 144km/h
Length 3.06m
Type 25 x 1/2λ co-linear
Cat D-4870

Limited Stocks!

$249

HF/6m POWER/SWR METER

$199

A superb wideband SWR/Power meter which boasts quality Japanese construction and a truly accurate P.E.P. metering circuit (unlike many other so called P.E.P. monitor systems). The Revex W502 features solid construction with an all-metal case and a large back-lit meter .. and it covers the 1.8 to 60MHz range with less than 0.1dB insertion loss. With 20W, 200W and 2kW power ranges and LED indicators which show average or P.E.P. operation. Requires 13.8V DC @ 200mA power supply.

Cat D-1360

2m ½ WAVE BASE STATION ANTENNA

MOBILE ONE

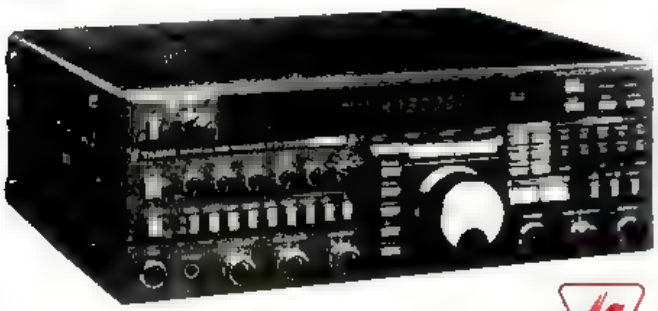
A outstanding value for money, compact, Australian made base station antenna which is only 1.69m long. It uses a single section F.R.P. radome for excellent all-weather operation and covers 144-148MHz with less than 1.5:1 SWR. The antenna provides approximately 3dB gain with a maximum power handling of 200W FM. It's fitted with an SO-239 socket mounted into the base for easy coax connection and comes with a 5 year warranty.

Cat D-4820

$49.95

FT-736R VHF/UHF BASE STATION TRANSCEIVER

2 YEAR WARRANTY!



Outstanding value and performance! Designed for the serious VHF/UHF operator this high performance transceiver provides 25W output (SSB, CW, FM) on the 2m and 70cm (430-450MHz) bands and can easily be expanded to also cover the 6m and 23cm (1240-1300MHz) bands. Quality features include keyboard frequency entry, 115 memories, 2 independent VFO's per band, separate FM channel knob with selectable steps and 2 full duplex VFO's for satellite operation. As well, there are IF Shift and Notch filters, noise blanker, all-mode VOX, SSB speech processor, GaAs Fet front-ends (430 and 1200MHz) high stability TCXO reference oscillator and an in-built AC power supply. Microphone optional extra.

Cat D-2920

Exceptionally Low Price!

*Hurry, stocks are very limited!**

$1995

* Some stock may be slightly shop soiled and may not be in it's original packaging. However all stock comes a Full Warranty

Yaesu Transceivers are available through all our stores, however they may not be in stock (or displayed) at all stores. For more information contact your local store or call into any of our Yaesu Super Stores located at: Sydney York St. (City) & North Ryde. Qld - Brisbane City & Chermside. Vic Springvale, Coburg & Bourke St. SA - Adelaide City

NSW • Albury 21 8396 • Bankstown Square 707 4888 • Blacktown 671 7722 • Brookvale 905 0441 • Bondi 387 1444 • Campbelltown 27 2199 • Chatswood Chase 411 1955 • Chullora 642 8922 • Gore Hill 439 5311 • Gosford 25 0235 • Hornsby 477 6633 • Hurstville 580 8622 • Kotara 56 2092 • Liverpool 600 9688 • Maitland 33 7866 • Miranda 525 2722 • Newcastle 61 1896 • North Ryde 878 3855 • Parramatta 683 2168 • Penrith 32 3400 • Railway Square 211 3777 • Sydney City 267 9111 • Tamworth 66 1711 • Wollongong 28 3800 **ACT** • Belconnen (06) 253 1785 • Fyshwick 80 4944 **VIC** • Ballarat 31 5433 • Bendigo 43 0388 • Box Hill 890 0699 • Coburg 383 4455 • Dandenong 794 9377 • East Brighton 592 2366 • Essendon 378 7444 • Footscray 689 2055 • Frankston 783 9144 • Geelong 232 711 • Melbourne City 399 Elizabeth St 326 6066 & 248 Bourke St 639 0396 • Richmond 428 1614 • Ringwood 879 5338 • Springvale 547 0522 **QLD** • Brisbane City 229 9377 • Burenda 391 6233 • Cairns 311 515 • Chermside 359 6255 • Redbank 288 5588 • Rockhampton 27 9644 • Southport 32 9033 • Toowoomba 38 4300 • Townsville 72 5722 • Underwood 341 0844 • **SA** • Adelaide City 223 4122 • Beverley 347 1900 • Elizabeth 255 5099 • Enfield 260 6088 • St Marys 277 8977 **WA** • Cannington 451 8666 • Fremantle 335 9733 • Perth City 481 3281 • Midland 250 1460 • Northbridge 328 6944 **TAS** • Hobart 31 0800 **NT** • Stuart Park 81 1977 **ORDER BY PHONE OUTSIDE SYDNEY (008) 226810 FREE CALL SYDNEY AREA 888 2105**

DICK SMITH ELECTRONICS

BT 148, PB

MORE FEATURES FOR YOUR MONEY!

FT-411E 2M HAND-HELD

Superb performance on the 2M band with all of the 'top-of-the-line' features and reliability you know you can expect from Yaesu! Don't be fooled by unknown brands which can only offer some of these features...

— 144 to 148MHz tranceive operation, with enhanced receiver performance
— Ultra long life 1000mAH NiCd battery pack
— 2.5 watts RF output as standard, up to 5 watts with 12V DC (or FNB-11)
— Better than 0.16uV (12dB SINAD) sensitivity
— Programmable power saver for extended operating periods
— Keypad or dial frequency entry, with 5 selectable tuning rates
— 49 tunable memories which store repeater offsets
— Band, memory, priority, or limited-band scanning
— Carry case, belt clip, approved AC charger
— **2 Year Warranty!**

*** Now with enhanced receiver sensitivity, and improved strong signal handling!**

Cat D-3350

$449

YAESU

2m & 70cm In One!

THE AMAZING FT-470

Hand held performance at its best! The FT-470 represents the pinnacle of high-tech design in compact hand helds providing both 2m and 70cm coverage in one 2.3 watts on the 2m and 70cm bands with the latest multi-tasking microprocessor control allows a high degree of flexibility. In fact, several functions can be performed simultaneously - including 'dual-band' reception, as well as 'full duplex' operation! That's right, you can be talking through your local 2m repeater and scanning channels for your next 70cm contact at the same time.

There are also 21 tuneable memories and 2 VFO's per band, plus inbuilt C.T.C.S.S. (Tone Squelch, encode/decode) with paging facility, a variety of scanning facilities, LCD display showing 5.5 frequency digits on both bands at the same time, and an LCD bargraph signal/P.O. meter. The programmable 'power saver' system helps maximize battery life, and frequency selection via tuning knob or direct keyboard entry is a standard feature. Comes complete with an ultra long-life 1000mAH NiCad battery pack, carry case, dual band antenna, and an approved AC charger. Why buy 2 hand-helds when you can have everything in one?

See A.R.A review Vol 12, Issue 5, or A.R. review Aug '89 issue

Cat D 3360

2 YEAR WARRANTY!

SAVE $100! **$699**

YAESU STOCKS NOT HELD AT ALL STORES. PLEASE CONTACT YOUR LOCAL STORE FOR STOCK AVAILABILITY, OR ORDER BY PHONE.

DICK SMITH ELECTRONICS

B1158

CONTESTS

(INFORMATION PROVIDED BY THE RELEVANT CONTEST MANAGERS)

Contest Calendar

July
13-14 IARU HF World Championship Contest
20 Sunshine State Jack File Memorial Contest
20 Colombian Independence Day Contest

August
10-11 European DX Contest - CW
17-18 RD Contest
17-18 Keymen's Club of Japan CW Contest

September
7-8 32nd All Asian DX Phone
14-15 33 Scandinavian CW Contest
14-15 European DX Contest - SSB
21-22 33 Scandinavian Phone Contest

October
5-6 VK-ZL Oceania DX-SSB
13-13 VK-ZL Oceania DX-CW
26-27 CQ WW DX Phone Contest

November
8-10 Japan International DX Contest
9-10 European DX Contest RTTY
23-24 CQ WW DX CW Contest

December
7-8 ARRL 160m CW Contest
14-15 ARRL 10m CW and Phone Contest

The 15th West Australian Annual 3.5MHz CW & SSB Contests

Transmitting & Receiving Rules

1 Duration
CW Sunday 3 August
SSB Sunday 7 September between the hours of 1030 and 1330 UTC time ie three operating hours for each contest

2 Frequencies
All contacts to be made in the 3 5/3.7MHz band using frequency allocation applicable to your licence conditions

3 Calling
Stations will call CQ WAA using the three-times-three technique Infringement of this rule by the use of long CQ calls may entail disqualification, as will prearranging of a QSO

4 Scoring
Points for contacts are as follows:
Within Western Australia 5 points per contact
WA to all mainland eastern states 2 points per contact
WA to VK7 4 points per contact
WA to VK0 and overseas 8 points per contact
3 points per contact with WA stations only

5 Multipliers
A multiplier of two per WA shire worked will apply to the final score
WA stations north of the 26th parallel only: an additional multiplier of 1.3 will apply per confirmed contact with stations south of the 26th parallel

6 Contacts
Stations may be worked twice on each night, ie once between 1030 to 1300 UTC, and again between 1300 to 1330 UTC. These contacts will count for points. Each time the contact for WA stations will take the form of an exchange of five characters comprising RST/RS and shire letters, eg A station in Northam sends 579NM or, if in Harvey 579HY; thus helps towards the worked-all-shires award.
Eastern states and overseas stations will send RST/RS plus a running number starting at 001.

7 Logs
Contest logs are to be set out on one side of a quarto or foolscap sheet with columns headed as below:

Date:		Call:			Operator	
Time Z	Call Wkd	RST Out	RST In	Shire Letters	Shire Multiplier	Points Claimed

Column 7 to be totalled at the foot of each page and the running totals brought forward. The last page to contain the following summary: Total number points scored; input power, equipment and antennas used, along with comments on the contest in general. SWL participants score as above using the outgoing TX score.

All logs should be addressed to the WAS Contest Committee, 42 Kennedy Street, Melville WA 6156, and posted so as to reach us not later than 4 October for both contests. The results for all contests will be published in the December issue of *AR*.

Shire Identification Letters

1	Albany Town	AT
2	Albany	AL
3	Armadale	AK
4	Augusta/Margaret River	AM
5	Bassendean	BA
6	Bayswater	BW
7	Beverley	BV
8	Boddington	BO
9	Boulder	BD
10	Boyup Brook	BB
11	Bridgetown/Greenbushes	BG
12	Brookton	BK
13	Broome	BE
14	Broomehill	BH
15	Belmont	BL
16	Bruce Rock	BR
17	Bunbury	BY
18	Busselton	BN
19	Canning	CA
20	Capel	CL
21	Carnamah	CH
22	Carnarvon	CN
23	Chapman Valley	CV
24	Chittering	CI
25	Claremont	CT
26	Cockburn	CR
27	Collie	CE
28	Coolgardie	CG
29	Coorow	CW
30	Corrigin	CS
31	Cottesloe	CO
32	Cranbrook	CK
33	Cuballing	CB
34	Cue	CU
35	Cunderdin	CD
36	Dalwallinu	DU
37	Dandaragan	DN
38	Dardanup	DP
39	Denmark	DK
40	Donnybrook/Balingup	DB
41	Dowerin	DR
42	Dumbleyung	DG
43	Dundas	DS
44	East Fremantle	EF
45	East Pilbara	EP
46	Esperance	ES
47	Exmouth	EH
48	Fremantle	FM
49	Gingin	GG
50	Gnowangerup	GP
51	Geraldton	GN
52	Goomalling	GM
53	Gosnells	GS
54	Greenough	GR
55	Halls Creek	HC
56	Harvey	HY
57	Irwin	IN
58	Kalamunda	KA
59	Kalgoorlie	KL
60	Katanning	KG
61	Kellerberrin	BN
62	Kent	KT
63	Kojonup	KP
64	Kondinin	KD
65	Koorda	KO
66	Kulin	KU
67	Kwinana	KW
68	Lake Grace	LG
69	Laverton	LV
70	Leonora	LA
71	Mandurah	MB
72	Manjimup	MP
73	Meekatharra	MK
74	Melville	MV
75	Menzies	MZ
76	Merredin	MD
77	Mingenew	MW
78	Moora	MA
79	Morowa	MR
80	Mosman	MS
81	Mukinbudin	MU
82	Mullewa	ME
83	Mundaring	MG
84	Murchison	MH
85	Murray	MY
86	Mt Magnet	MM
87	Mt Marshall	ML
88	Nannup	NP
89	Narembeen	NN
90	Narrogin	NG
91	Narrogin Town	NT
92	Nedlands	NL
93	Northam	NM
94	Northam Town	NO
95	Northampton	NH
96	Nungadin	NG
97	Peppermint Grove	PG
98	Perenjori	PJ
99	Perth	PH
100	Pingelly	PY
101	Plantagenet	PT
102	Port Hedland	PD
103	Quairading	QG
104	Ravensthorpe	RT
105	Rockingham	RM
106	RoebourneRB	
107	Sandstone	SS
108	Serpentine/Jarrahdale	SJ
109	Shark Bay	SB
110	South Perth	SP
111	Stirling	ST
112	Subiaco	SU
113	Swan	SW
114	Tambellup	TP
115	Tammin	TM
116	Three Springs	TS
117	Toodyay	TY
118	Trayning	TG
119	Upper Gascoyne	UG
120	Victoria Plains	VP

121	Wagin	WN
122	Wandering	WD
123	Wanneroo	WO
124	Waroona	WR
125	West Arthur	WA
126	Westonia	WS
127	West Pilbara	WP
128	Wickepin	WI
129	Wiluna	WU
130	Williams	WL
131	Wongan/Ballidu	WB
132	Woodanilling	WG
133	Wyalkatchem	WY
134	Wyndham East Kimberley	WE
135	West Kimberley	WE
136	Yalgoo	YO
137	Yilgarn	YN
138	York	YK

Rules for the 1991 VK-ZL-Oceania DX Contests

1. **SSB**; from 0100 UTC 5 October until 0100 UTC 6 October 1991

1a. **CW**; from 0100 UTC 12 October until 0100 UTC 13 October 1991

1b. **Receiving**: times as in 1, and 1a

2 Only one contact per mode per band is permitted. All bands EXCEPT WARC bands may be used

3. **Scoring:**
For stations operating OUTSIDE Oceania, score two points for each contact with VK, ZL or Oceania stations
Oceania stations score two points for all contacts. NB: Oceania stations are those which qualify as Oceania for WAC

4. **Final Score:**
Multiply the total QSO points by the sum of all VK/ZL/Oceania prefixes worked on ALL bands (the same VK/ZL/Oceania prefix worked on a different band counts as a different unit)

5. **Cyphers:**
Exchange a five or six number composed of RS(T) report plus a three-digit number beginning at 001 and increasing by one for each QSO on that band

6. **Logs**

(a) Separate logs for each band, please, and for SSB and CW sections

(b) Show date, time UTC, call of station contacted, cyphers sent and received

(c) Indicate clearly each NEW VK/ZL/O prefix worked. Underline, highlight or show in a separate column, as in WPX

(d) State QSO points claimed for each band

(e) State VK/ZL/O prefixes claimed for each band

(f) Summary sheet to show:
*Callsign
*Name and address of operator
*Total QSO points claimed on all bands
*Total VK/ZL/O prefixes contacted on all bands
*Total points claimed
*Signed declaration that the rules have been obeyed
*Post your entry to:
WIA VK/ZL/Oceania Contest Manager, Frank Beech VK7BC, 37 Nobelius Drive, Legana, Tasmania Australia 7727.
Entries to arrive before 25 January 1992

7. **SWL Section:**
A VK/ZL or Oceanian station must be heard in a contest QSO. Logs to be set out as in the Transmitting section

8. **Awards:**

(a) Special certificate to the top scorer in each Continental area

(b) Special certificate to the top scorer in each country when there are more than five entries from that country, or if less than five entries from that country, scores more than 500 points

(c) Participation certificates to all others on request (three IRCs for postage please). Copy of relevant results (one IRC & SAE please).

Information for VK and ZL Stations

Check with overseas rules

Rules 1, 2, 5 and 6 as for overseas stations (except in rule six deadline)

Rule 3. Scoring

Different points for contacts on different bands are as follows:

160m 20 points
80m 10 points
40m 5 points
20m 1 point
15m 2 points
10m 2 points

Total Score:

Will be the total QSO points multiplied by the total number of prefixes worked. The same prefix worked on a different band is counted. (Note) K1, W1, AA1, N1 etc are all different prefixes. W1AAA/6 would count as W6, not W1.

VK and ZL stations are permitted to contact each other ONLY on 160 and 80m. VK/VK; ZL/ZL and ZL/VK contacts are permitted on 160 and 80m ONLY

Rule 6: Logs

VK and ZL logs to arrive no later than 16 December 1991

SWL Section.

As for overseas stations, BUT;

*VK SWLs must hear and log ZL or other stations (no VKs)

*ZL SWLs must hear and log VK or other stations (no ZLs)

Rule 8: Awards

Separate awards for SSB and CW sections.

(a) Special certificate to top scorers in each call area

(b) Special certificate to top scorer in each band

Entries to: WIA VK/ZL Oceania DX Contest Manager, Frank Beech VK7BC, 37 Nobelius Drive, Legana, Tasmania 7277. ar

VHF/UHF AN EXPANDING WORLD

ERIC JAMIESON VK5LP
PO Box 169, MENINGIE 5264

(All times are UTC)

Australian Amateur Bands Beacons

Freq	Callsign	Location	Grid square
50.053	VK3SIX	Hamilton (1)	QF12
50.056	VK8VF	Darwin	PH57
50.066	VK6RPH	Perth	OF78
52.320	VK6RTT	Wickham	OG89
52.325	VK2RHV	Newcastle	QF57
52.330	VK3RGG	Geelong	QF21
52.345	VK4ABP	Longreach	QG26
52.370	VK7RST	Hobart	QE37
52.420	VK2RSY	Sydney	QF56
52.425	VK2RGB	Gunnedah	QF59
52.440	VK4RTL	Townsville	QH30
52.445	VK4RIK	Cairns	QH23
52.450	VK5VF	Mount Lofty	PF95
52.464	VK6RTW	Albany	OF84
52.470	VK7RNT	Launceston	QE38
52.485	VK8RAS	Alice Springs	PG66
144.400	VK4RTT	Mt Mowbullan	QG62
144.410	VK1RCC	Canberra	QF44
144.420	VK2RSY	Sydney	QF56
144.430	VK3RTG	Glen Waverley	QF22
144.445	VK4RIK	Cairns	QH23
144.445	VK4RTL	Townsville	QH30
144.460	VK6RPH	Perth	QF78
144.465	VK6RTW	Albany	OF84
144.470	VK7RMC	Launceston	QE38
144.480	VK8VF	Darwin	PH57
144.485	VK8RAS	Alice Springs	PG66
144.530	VK3RGG	Geelong (2)	QF22
144.550	VK5RSE	Mount Gambier	QF02
144.600	VK6RTT	Wickham	OG89
144.800	VK5VF	Mount Lofty	PF95
432.160	VK6RPH	Perth	OF78
432.410	VK1RBC	Canberra	QF44
432 420	VK2RSY	Sydney	QF56
432 440	VK4RSD	Brisbane	QG62
432 445	VK4RIK	Cairns	QH23
432.445	VK4RTL	Townsville	QH30
432.450	VK3RAI	Macleod	QF22
432.535	VK3RMB	Mnt Bunnyong	QF12
432.540	VK4RAR	Rockhampton	OG56
1296 410	VK1RBC	Canberra	QF44
1296 420	VK2RSY	Sydney	QF56
1296.440	VK4RSD	Brisbane	OG62
1296 445	VK4RIK	Cairns	QH23
1296 480	VK6RPH	Perth	OF78
2304 445	VK4RIK	Cairns	QH23
2306.440	VK4RSD	Brisbane	OG62
10445.000	VK4RIK	Cairns	QH23

(1) A new 6m beacon, VK3SIX, at Hamilton on 50.053 (zero beat) heads the list. Steve VK3OT says it is a supervised beacon at 100 watts erp with an antenna of stacked dipoles. It has been

installed with a view to filling the gap in regard to warnings of F2 propagation from south-eastern Australia. The present 50MHz beacons in Alice Springs and Perth cover a large portion of the western section of the continent, while Channel 0 at Toowoomba in Queensland provides some information to the north-east. The beacon is planned to run while there remains F2 propagation associated with Cycle 22. Reports are welcome.

(2) Charlie VK3BRZ advises there are problems with the Geelong beacon VK3RGG on 144.530. It was off air at the time of writing, but may be on again by the time these notes are read. Charlie also said a site in the Otway Ranges is being evaluated as a beacon site in lieu of Mount Anakie, which is close to their centre of 2m activity and can cause overload probleme for operators.

Six Metres

Since the last report of the opening on W5 on 8/5 there have been few reports of long-distance DX except for almost daily openings to Japan (usually between 0200 and 0400) which continued until about mid-May, then became spasmodic.

David VK2BA has submitted very well presented confirmations of his Six Metre Standings List and included a few other comments as follows. He managed to extract five new countries this year - KG6UH/DU2, VK63AQ, 9Q5EE, FM5WD and AH6JJ/AHO, with the latter yet to be confirmed. In all, 22 countries were available to Sydney operators during March/April 1991 - KG6, DU1, JA, ZL, XE, W4, 5, 6, 7, V63, KH6, FO5, A35, YS1, V73, 9Q5, FK8, AH3, FM5, 3D2, V31, ZK1, P29, AH0 and VK. This compared with 24 in the same period in 1990, and 35 in 1989.

David said he was very impressed at the quality of some of the DX that has been worked by VK as a whole. It really has been a very good season, as some of the best DX so far this solar cycle was worked. He compliments VK7IK, who demonstrated that it was possible for VK7 to share in the DX, if one was prepared to really put in some effort.

How Europe Sees It

Ken Ellis G5KW sends copies of his "VHF/UHF Message" in *Ham Radio Today* for April/May/June and refers to 6m between the UK and VK. He said that it all started on 26/11/80 when at 0955 Gordon G4BPY reported hearing the VK6RT beacon. On 27/11/80 G4BPY reported his first reception of VK6RTU in Perth from 1858 to 1909, peaking 549. At 1000 he had a crossband QSO with Andy VK6OX to make the first historic 6m UK WAC. The second QSO was with Brian G3COJ, and the third with Ken G5KW. These operators were the only three to make it, and no other two-way or crossband QSOs took place until 20/3/89, when the all-time first two-way 6m QSO took place between the UK and VK6WD.

WAC on Six Metres

The openings to VK during 11-12 October 1989 provided several UK stations with their first two-way QSOs with Australia to complete their 50MHz WAC. The VK opening began at 0920 on 11/10 with G4CCZ, G2ADR, G4FKW and G3ENZ working VK8GF, VK8ZLD and VK8KTM. G5KW worked VK3OT at 0932. During the opening on 12/10 between 0830 and 1000, many Gs had QSOs with VK2, 4 and 8, with at least eight G stations qualifying for WAC. Since then, of course, the legendary openings to Europe in 1990 and 1991 are history.

Continuing with the notes from G5KW, Ken advises that Geoff GJ4ICD worked all continents in three hours and six minutes on 3/3/91! Geoff said he switched on at 0920 and worked VK6PA; 0924 JA4MBM followed by over 70 other JAs worked. At 1028 he worked KG6DX, KE0SC/DU3, KG6UH/DU1, V73AT, KH4AF. Then from the south came TL8MB, TR8CA, G8MFE/5N2 and 9L1US. Europeans on backscatter from 180 degrees SV10E, PA, ON, F, I etc, 6W1QC, PZ1AP, VE1YX, KP2A. (Those highlighted represent the WAC contacts).

EME Antenna 8 x 7.7λ DJ9BV

Israel

Ralph 4X1IF received permission to operate on the 6m band early in February. Extra Class stations only will be permitted, using 25w output and operating from 50.100 to 50.150. Ralph has worked many stations crossband over the years and is considering running a beacon on 50.145MHz.

Other Snippets from G5KW

A station in the USSR with facilities for crossband working to 6m is UL7GCC in Alma Ata. He has a five-element beam and worked G4JCC for his first QSO on 22/1/91 at 1028.

CU1EZ in the Azores is to receive a 160w linear from JA stations; JAs are also planning a 100-200w amplifier for CN8ST in Morocco.

David ZD8DX will soon be active from Ascension Island; his QSL manager is WB2K.

Peter 9J2HN of Zambia (home callsign JK1UWY) hopes to be on 6m from May using an IC551 to a six-element Yagi.

Eric TL8MB will be operating from the Central African Republic until about September.

Cyprus 5B4 stations have been permitted on 6m since November 1990.

Martin VP8CEX is a new 6m station from the Falkland Islands. He has worked into LU and been heard in W4.

A beacon in Paraguay is ZP5AA running 5w CW on 50.0245MHz. ZP6XDW is active from that country.

From the USA

Bill Tynan WXXO/5 from QST and "World Above 50MHz" reports that on 23/2/91 N6OLD and KK6TG had an SSB contact on 24.192100GHz over a distance of 125 miles (200km). Equipment at KK6TG was about 5mW to a 16" dish and a 14dB noise figure receiver. At N6OLD, about 2mW was used into a 20" dish and a 12dB noise figure receiver. The signals were so strong that communications could be maintained with only an open waveguide at one of the stations. KK6TG runs a 300 microwatts beacon on the same band.

DXCC on Six Metres

After sitting on 99 countries for some time, on 1/2/91 GJ4ICD from Jersey heard the 9L1 beacon at 1030 at S9+ and at 1058 worked PT7NK for country 100. Later in the day Geoff worked KP2A, 9Y4VU, PZ1AP and PJ4E to finish an historic day! Congratulations! Who would have thought 100 countries would have been possible in the two and a half years that the UK has had 50MHz privileges.

Ken G5KW also reports that on 10/3/91 G4UPS ex ZD8TC worked ZP6XDW at 1341 to give

him his 100th country worked on 6m.

VHF Liaison Frequency

Charlie VK3BRZ raises again the issue of the need for one or more frequencies in the HF spectrum which can be used for VHF net purposes and for information regarding VHF openings - similar to 28.885MHz, which is used on a world-wide basis for the dissemination of news on 6m activity

Recently a group of operators in Victoria commenced using 3695kHz on an informal basis some evenings, but need input from operators in other areas. The reason for the choice of frequency is that there is a fair chance it will be free most of the time. Charlie accepts that the chosen frequency is not available to combined novice/limited operators, but tests have indicated there is little free spectrum space in their segment. However, they would be able to listen. A daytime frequency on 20 or 40m would also be desirable.

The idea has a lot to commend it, but its ultimate success will depend on the input from those who are hearing other operators, perhaps too weakly to make direct contact, or reporting on the reception of beacons. With a liaison frequency, the role of beacons will become very important, which means more attention will need to be paid to keeping the beacons active at all times.

If you are interested, you could come up on 3695kHz and indicate who or what you are hearing and/or make some skeds to test band conditions. Information could be shared relating to 144, 432 and 1296MHz. If you believe there is a more suitable frequency, then notice of such could be conveyed on 3695kHz.

From Mount Isa

Mike VK4BFO from Mount Isa reports that Steve VK4ZSH has been operating portable in the area and sharing contacts with him, also VK4AQZ and VK4KIT in Mount Isa.

From a point west of Urandangie in the Northern Territory, Steve worked all three stations on 25/4 with signals up to 5x8. He also worked VK4BFO on 26/4 and 27/4 from the same location, on 4/5 from Gregory River NT (west of the Three Ways intersection) and on 6/5 from Karumba in the Queensland gulf country. All contacts were on 144.100 SSB.

In addition to the contact with JI7DMB last month, for which he has claimed a VK two-metres record, Mike worked JI1WGM and JL1LMM on 5/5 with reports to 549, so the 2m activity in that region has its rewards!

Albany Reports

A somewhat dated, but still useful, report is to hand from Brian VK6YAU and Wally VK6WG of Albany, Western Australia, which once again confirms that there is something about that period around the end of January when consistent contacts can be made across the Great Australian Bight between Albany and stations in VK5 and VK3 on 144, 432 and 1296MHz over a path length of more than 2000km. As always, the relevant 2m beacons gave early warnings of the openings.

The first contact for the spring/summer period was on 23/10/90 at 1220 with up to 5x9 signals between VK6YAU and Phil VK5AKK on 432MHz. No QSO could be made on 144MHz. Both bands were open to VK5AKK again on 11/11/90 at 2200 and 29/11 at 0926.

Nothing further was available until 7/1/91, when Brian was alerted by the VK5 Adelaide beacon at 2145 and worked Phill VK5AKK, Mick VK5ZDR, Andrew VK5ZUC and Col VK5RO on 144 and 432MHz, and with VK5AKK on 1296 with signals 5x2.

Brian's main activity commenced on 28/1/91 at 0055 when on 432 he worked Steve VK5ZBK, then on 29/1 between 1019 and 1047 Mark VK5ZMK, Steve VK5AIM, VK5ZMK, Phil VK5AKK, Ern VK5EN and Keith VK5AKM on 144, signals between 5x1 and 5x5. 30/1 produced on 144 at 2148 VK5ZBK, 2238 David VK6UI (south of Perth), then on 432 between 1219 and 1305 VK5RO, VK5AKK, VK5EN, VK5ZGT and VK5AKK, signals from 5x3 to 5x9.

On 31/1 from 2146 to 2154 VK5AKK on 144, 432 and 1296; 2159 VK5ZDR 5x9 on 144, 2200 5x9 on 432 SSB and 5x9 on FM, from 2215 VK5BGY, VK5NX and VK5ZJA via Mount Lofty repeater; 2226 VK5RO 432 and 144, 2142 Bill VK6AS at Esperance on 144, then the following on 432 between 1038 and 1159 - VK5AKK, VK5ZUC, VK5WA, VK5ACE, VK5ACQ, VK5AIM, VK5RO, VK5ZMK, VK3AFW, VK3ZJC, VK3YTU plus VK5ZMK at 1128 on 1296 (Mark was running 800mW) 4x1. At 1200, he worked VK3JED via the Mount Macedon repeater.

The band was still open on 1/2 between 2130 and 2235 on 144 and 432 to VK5ZDR, VK5AKK, VK3AFW, VK3CY, VK5RO with signals between 5x4 and 5x9; at 2146 to VK5AKK on 1296 at 5x4. Brian reports that there were more contacts on 432 than 144MHz and five contacts on 1296MHz. Although the above contacts are from the log of VK6YAU, WALLY VK6WG was also involved.

EME News

After a very long drought, there is some EME news to report. Doug VK3UM has sent details of his monthly activity. This has been achieved using his new array of eight 7.7 wavelength DJ9BV antennas and his MGF1302 cavity preamp. Almost every contact was made as a result of random calling.

20/1/91: 0100 VE1BVL, 0950-1025 F1FHI, DL3YEE, F1ANH, F6CJG. 26/1: 1209-1350 OK1KIR, VK5MC, SM0PYP, LA8LF, PA3CSG, ZS6AXT. 27/1: 1346 RB5LGX. 1/2: 2055-2200 F1ANH, DJ9MB, YO2IS. 23/2: 1100-1250 DK3FB, DL3YEE, SM2CEW, F1ANH, G4RGK. 23/3: 0413-0530 K1FO, NU7Z. 1030-1218 RW3RW, SP5CJT, G3LQR, G4ALH. 24/3: 1248 HB9SV, DL9NDD, DL6WU.

20/4: 0255-0415 K2UYH, AA4TJ, N4GJV, W7GBI, VE1BVL, K9UIF, KD4LT, JA4BLC, WA4OFS. 0922-1107: OK1KIR, RB5LGX, LZ2AR, LA8LF, DF3RU, KG1YA, DL9KR, RA3YCR, PA3AEF, DL3YEE. 21/4: 0345-0536: VE1BVL, W7FN, K5JL, JA7BOH, VK1VP, K1FO, KB4WM. 1017-1156. VA6LGH, SM3AKW, LA8LF, SM0ERR, SM2CEW.

Most of the signal reports are 449 or 559, with a few weaker ones. Thanks for writing, Doug. By the way, Doug actually made 16 7.7 wavelength antennas, but could not bring himself to accept the possible consequences of gale force winds if he erected them all!

Closure

Due to space limitations, some information has been held over until next month.

Closing with two thoughts for the month. "Early to bed and early to rise make a man healthy, wealthy and apt to mention it", and "Bureaucracy is based on a willingness either to pass the buck or to spend it". 73 from "The voice by the lake". ar

HOW'S DX

Stephen Pall VK2PS
PO Box 93, Dural 2158

"Is this frequency in use?" Do you remember the "good old days" not so long ago, when people were polite to each other, not only in their everyday lives, but also on radio amateur frequencies? The real truth is that today, contrary to common sense and amateur radio regulations, (See DOC 71/1989, Part 2, paras 26 and 27) there is a lot of intentional interference on the bands, both local and international. If you tune across the 20m band, which is regarded generally as a frequency for distant communications, you hear comments like these: "I was here first", "This is my usual personal frequency", "I am bigger and more powerful than you" "I have to tune up somewhere" (that there is such a thing as a dummy load does not occur to the person saying that), "I do not like you and/or your net", "I do not care about the DX in the background; I want to chat to my friend" (who, incidentally is only 10km away at the other end of town).

The number of amateurs operating on the 20m band is increasing, but the band is not expanding. What happened to the WARC bands? If you want a chat with your friend, why don't you use the 24, 18 and 10MHz bands? It is quiet there; those bands are ideal

for ragchewing, and there is plenty of room for everyone. Please stop and think before you use the bands, and think about the purpose of your planned activity. And remember: being polite does not ruin your reputation!

Bhutan A51

What appeared to be a riddle last month became the plain truth this month: radio amateur jealousy!

Jim VK9NS and Kirsti VK9NL are back on Norfolk Island after an unsuccessful attempt to operate amateur radio from Bhutan. Jim's explanation of the failed mission was published in several DX publications. Here is a short resume of what happened.

Last year, after he spent a considerable time on delicate negotiations with the Bhutanese Ministry of Communications, Jim was granted permission and had a successful operation from that country with the callsign A51JS. One of course has to remember that this was a special permission granted to him, to operate amateur radio in a country where such activity is not allowed for the country's own citizens. Jim's basic desire was to advance the cause of amateur radio in general terms, and to that purpose he did a lot of voluntary work before and during his stay - behind the scenes - in assisting with preparations of the syllabus for future radio operators, with regulations for the future amateur service etc.

When he left Bhutan last year, he donated all the equipment used by him to a future amateur radio club station.

It is now known that, after Jim concluded his visit last year, the Bhutanese Ministry of Communications was bombarded by various foreign radio amateurs, who had no previous negotiations with that Ministry, to grant them permission to operate from Bhutan.

It appears that one particular group (which Jim did not name, for obvious reasons) was very vocal and demanding. The usual stereotype argument was used: "He was given permission, why can't I get one?"

The Bhutanese officials were worried that if they did grant a second permission to Jim and Kirsti to operate it could create such a precedent that they would have faced a more fierce battle second time around with the invading foreign amateurs. So they did what seemed to be the best solution for their country: politely but firmly refused Jim and Kirsti's application.

According to Jim, there is a genuine interest in amateur radio in Bhutan, and things are happening. But it seems to me that the speed of change is dictated by Bhutan's national interest, and not by uncalled and wanted outside pressure by foreign amateurs.

Before departing from Bhutan, Jim had donated all the amateur equipment which he carried to Bhutan, totalling some $4000 in value, in the name of his supporting organisation HIDXA (Heard Island DX Association) to the Bhutan Amateur Radio Club Station.

A humpback whale in Hervey Bay

South Georgia - VP8SGB

South Georgia is an island group in the south Antarctic Ocean and politically is a dependency of the Falkland Islands. As a DXCC country, it is very much in demand. During the month of May, John became active from Bird Island, one of the islands in the group. The island group is situated at latitude 54°03' South and 36°08' West. John is an Australian and originates from Melbourne, with not much experience in DX QSOs. He is a marine biologist and is attached to the British Antarctic Survey Group and uses, for the time being, the South Georgia Base callsign, but has applied for his own call. John will stay on the island until April 1993. This will give the opportunity to many DXers to work this rare country for their DXCC. John appears on the "226" net (14226.5kHz) at around 9.00-9.30 UTC on Tuesdays. QSL manager is VK4MZ: K Viney, PO Box 381, Gympie, Qld 4570.

The Arctic Regions and EK0KBZ

Max VK2APD has sent me an interesting letter and a beautiful colour QSL card - only to look at - from Serge UA0KBZ, who operates at EK0KBZ attached to the US/USSR Dog Sled Expedition to Wrangel Island in the Arctic.

Serge waited one year for his QSL card to arrive from the printers in Finland. He asks everyone that if they wish to receive any QSL cards from EK0KBZ, 4K4/UA0KBZ or from UA0KBZ they should apply for them now. Send your cards with two IRCs or one "green stamp", no reply envelope, and no callsigns on the outer envelope, to: Serge Tsybizov, PO Box DX 485, Cape Schmidt, Magadan Oblast, 686830 USSR, to arrive before August 1991, as he is moving from the Arctic regions to central Russia, to Voronezh City (UZQ/UA0KBZ). Quote from Serge's letter: "I absolutely haven't possibility to use USSR QSL Bureau because QSL Bureau in practice absolutely not work from our region."

The expedition was sponsored by the Russian "Sputnik" illustrated monthly digest, and is part of the "Big Circle" dog-sled expeditions extending into 1995, to the northern regions of Asia, America and Europe.

Humpback Whales - VI4HBW

The Hervey Bay Amateur Radio Club (PO Box 829, Hervey Bay, Qld 4655) will be activating a special event station with the callsign VI4HBW from 1-31 August. This activity will coincide with the annual Festival of Whales, which celebrates the arrival of the whales into the sheltered waters of Hervey Bay. During the three months, starting from August, these gentle giants of nature rest and rear their young, using the bay's warm waters as their personal playground before they continue their migration south to the Arctic Ocean.

The special event station will be active on the usual DX frequencies on 80, 40, 20, 15 and 10m, and a 24-hour operation is contemplated in the first week of August. A special award and QSL card are planned to commemorate the event.

Ethiopia - ET2A

Jack W4IBB was back again in Ethiopia, on his own, as ET2A. This time he was quite active on both CW and SSB, and this provided a good opportunity to many VK/ZLs to work him. Whilst the political situation gave rise to some concern by others, he was still operating. However, on 28 May, one could feel that the situation became grave as far as Jack was concerned, because he said on the band that he wanted to pass messages to the US Regula-

tions governing third party traffic prevented him saying what his true situation was. Hopefully he was able to survive the upheaval in Addis Ababa QSL for the new operation, which started on 8 May, to a new QSL manager, F6HIZ Pierre Essinger, PO Box 67, F-06140, Vence, France

Tromelin - FR5AI/T

Yoland was very active from Tromelin, generating huge pile-ups wherever he appeared on the various bands.

He started on 5 May and planned to be active for one month, depending on transportation schedules From VK it was quite difficult to work him, because he was on a working assignment, so he could operate only in his spare time. Taking the time difference into account, the situation was not easy However, he was quite a good copy in VK on 25 May, on the short path, on 21234kHz, and a number of VKs worked him. There is some confusion about his QSL address as given over the air, but this is how it appears in the International Callbook: Yoland Hoarau, 4eme Km St Francois, F-97400, Saint Dennis, Reunion Island via France Please remember: no callsigns on envelopes, and use only IRCs as return postage

Malyj Vysotskij Islands - 4J1FS

The islands, which create pronunciation problems for English speaking amateurs, came on the bands as per schedule It was a short operation lasting only five days, including the WPX (World Prefix) CW contest. Activity was on all bands, including the WARC bands. They had a booming signal to VK on 24 May on 14MHz QSL to: OH2BU Jari Jussila, Pilvijarvi, SF-02400, Kirkkonummi, Finland

Angola - D2ACA

After many weeks of waiting, the Russian DXpedition comprising five Russian amateurs became active in Angola. This operation was also of short duration, lasting only two weeks. Activity was on both CW and SSB QSL to LZ2DF

Myanmar (Burma) - XZ

According to fax messages received by various DX outlets, Romeo has received his licence for XS, and he sent it to the DXCC for approval. The group intends to operate from one of the Myanmar islands. According to Romeo it will be a costly expedition, in the vicinity of $US45,000

Future DX Activity

* PA0CRA is planning to visit Fiji, with possible trips to Rotuma, Wallis and Futuna, Naura and Tarawa in the first two weeks of July
* SV8/DF3IS will be active from Corfu Island from 20 July to 1 August.
* EA3CUU will operate from Pagalu Island (formerly Annobon) from 4-14 August, and will use the call 3C0CW.
* Laurent FT4YD is quite active in French Antarctica and will be there until January 1992.
* Mike KN4UL expects to be on the bands from Malawi as 7Q7MM for the next 18 months. QSL to N4RFN.
* Wolfgang DK4UW told me that he will be active as HK0/DK4UW in January 1993.
* Yet another Pacific DXpedition. Carlo I4ALU leaves Italy on 14 July and intends to be active only in CW, from 3D2, A35 and ZK1 (South). He may visit other islands.
* Terje LA3EX hopes to be on the bands as JX3EX for about six months. QSL to LA5NM
* John TR8JWH is in Gabon for a 12-month period.
* According to various DX sources, St Paul Island will be active from 1-7 August as CY9CWI.
* 4K1A is in Antarctica and expects to be there until 1992. The operator is Nick UZ1PWA.

Interesting QSOs and QSL Information

Note: Callsign, Name, Frequency, Mode, UTC, Month of QSO

OY1CT-Carsten-14001-CW-0500-May-QSL to: Carsten Thomsen, FR-340, Kvivik, Farce Islands, North Atlantic.

CM2VS-Juan-21006-CW-0530-QSL to: I0WDX Cesare Casaroli, Piazza Conti 2 I-00010 Poli, Italy.

4K4/UA0KW-21018-CW-0600-QSL to: UA0KCL

9X5HG-Hartmut-21034-0630-QSL to: Hartmut Gumpert, BP420 Kigali, Rwanda, Africa.

W5RRR-Karen-28MHz-0027-SSB-QTH. Lyndon B Johnson Space Centre, during shuttle flight STS-37 QSL to: NASA, Johnston Space Centre, Houston, Texas, USA 77058.

HP8ADU-Carlos-21MHz-SSB-0743-QSL to: Carlos Aguilar, Grobe Apt 13, Martin, TN-38237 USA.

XW8KPL-Phuthong-21MHz-SSB-1244-QSL to: Box 3770, Vientiane, Laos.

FT4WC-14027-CW-1340-May—QSL to: F6BVH Michel Godefert, BCAC, Courriers Exterieurs, 14 Rue Saint Dominique, F-75997 Paris, Armees, France

TL8MB-28474-SSB-0928-QSL to: F6FNU M Antoine Baldeck, Box 14, F-91291, Arpajon, Cedex, France.

5H5HH-Henry-14222-SSB-0623-May-QSL to: Henry Hourton, Box 1172, Nouakchott Mauritania, Africa.

J79MD-George-14165-SSB-1100-June-QSL to: N4CRU Frances T Sledge, 3004 Oakley Hall Road, Portsmouth, VA 23703 USA.

S79KMB-Keith-21205-SSB-0445-May-QSL to: KN2N Anita M Keighley, 4801 Warwick Way, Alexandria, LA 71303 USA.

OD5ET-Joe-21205-SSB-0449-May-QSL via Bureau or PO Box 55290, Beirut, Lebanon YI1BGD-14243-SSB-0645-May-QSL to: Box 7361, Baghdad, Iraq

C3URA-Fred-14151-SSB-0614-May-QSL to: URA, PO Box 150, Andorra, Europe

Y88POL-Walter-14226-SSB-1120-May-QSL to: Y32WN Siegfried Gedel, Box 21, Mittweida, 9250 Germany

4U6ITU-WOlfgang-1422-SSB-0745-17 May-QSL to: DF4UW Wolfgang Guenther, Maxmillian Str, 77, D-7570, Baden-Baden, Germany

V31SW-Scotty-21295-SSB-0540-May-QSL to: Scott T Williams, PO Box 1522, Belize City, Belize, Central America

CN8CH-Ismail-21205-SSB-0528-May-QSL to: Box 3055, Tanger, Morocco

FT4YD-Laurent-14165-SSB-1148-May-QSL to FD1NZO, Box 1, Vitry-Sur-Loire, France, F-71140.

* T95ITU-14072 at 0002Z, FEC, QSL to. FB5MUX.
* HP1DZO-21083 at 2108Z. QSL to: Box 842, APO, Miami, FLA 34004 USA.
* FM5DN-14092 at 0350Z QSL to: N3ADL.
* XF3AFU-21089 at 1945Z. QSL to: Box 642, Cancun, CP 77500, Mexico
* 6W6JX-14086-at 2010Z QSL to. Box 200, Kaolack, Senegal, Africa.
* EM2C-14087 at 0100Z QSL to: Box 80, Minsk 83, 220083 USSR.
* TA8C-21084 at 1815Z. QSL to: Box 13 Gaziantep, Turkey.
* YS70B-2084 at 2303Z. QSL to: Mario Batres, Calle Barios 14, Ahuchtan, El Salvador.
* A61AD-21092 at 2130Z. QSL to: WB2DND.
* SI4SM-14088 at 1118Z. QSL to. SK4BX.

From Here and There and Everywhere

* The net controller of the ANZA Net (21205kHz) Percy VK4CPA (see article in Sept 1990 issue of *AR)* had to spend some time in hospital to have a pacemaker fitted to regulate his own personal "oscillator" his heart. We wish Percy a speedy recovery and continued good health
* Bing VK2BCH of Rotuma (3D2XV) fame, moved in June to Pt Vila, Vanuatu and commenced operations with the callsign YJ0AXV
* Father Marshall Moran 9N1MM, the well-known amateur of Kathmandu, was 85 years old on 29 May He is still active on the bands, and expects to visit the US in October this year.
* EG8CAC was a special event station for 48 hours duration, to celebrate Canary Island Day. QSL to EA8ZX.
* AX2ITU was operated by the VK2 Division of the WIA, celebrating the 126th anniversary of the International Telecommunication Union (ITU) a United Nations

affiliated organisation which, among other things, regulates the International Radio Frequency Program worldwide ITU had its origins in the International Telegraph Convention held in Paris in 1865 which agreed on basic telegraph regulations.

* Joe OD5ET was booming in on the long path on 21MHz. Joe is on generator power supply, which limits his activities. He says that the Lebanon QSL Bureau is functioning again.
* C3URA was a special event station operated by the Andorrean Radio Amateur Society, celebrating the mini-olympics of the eight small European nations.
* The St Peter and Paul Rock DXpedition used two callsigns PY0SK (QSL to PS7KM) (see June *AR* for QSL address) and PY0SR (QSL to Jaime Dornelas, Rua Alfonso Penna 554, Estreito, 88070, Florianopolas, SC Brazil).
  Please include two IRCs or two "green stamps" with your reply envelope. Brazil now charges the equivalent of US$1 46 for overseas airmail.
* If you hear George W2NHZ from NJ on the band, give him a call. George collects VK QSOs. When I spoke to him on 28 May, I was his 982nd VK QSO.
* If you contacted II0ONU, it was an UNICEF special event station, and QSL goes to I5KKW via the Bureau.
* WO0G and AG9A were active from Belau, Western Carolinas, as KC6XX and KC6KW. QSL to their home call.
* Amateurs on Cayman Islands - ZF - are now allowed to use the WARC bands.
* Rumour has it that Ron ZL1AMO might go to Kermadec ZL8. He is now trying to organise transport to the islands.
* Another rumour heard on the band is that there will be a Glorioso Island activity in June or September.
* The YA0RR QSL cards are back from the printers, and the lucky ones who worked them can expect their cards soon.
* Another rumour: Some well-placed DXers said that North Korea will soon become a new DX country and the first activity will be by P5YL. Well, let's wait ... and see.
* Expect more activity from FP - St Pierre and Miquelon Island group. According to various DX outlets, there are now six candidates studying to pass the French amateur examinations.
* Do you need a QSL card for the May 1990 Yemen 701AA operation? Please QSL direct with the usual SAE and return postage (two IRCs) to DL2BCH, Gabriele Graeter, Bachstr 8, D-2907 Groesenkneten, Germany.
* Jim VK9NS has obtained a USA permanent extra class licence, WR1Z.
* Beiaiti T30DP has a new postal address: Send your cards to Beiaiti Highland, PO Box 473, Betio, Tarawa, Republic of Kiribati
* Antoine 3D2AG, who is a resident amateur of Fiji, will spend the first three weeks of July on Rotuma Island. As Rotuma is part of the Fiji Republic, he will use his own callsign, but will have a special QSL card printed for this occasion. He plans to be active mostly on CW, which will be much appreciated by those who need a CW contact with that DXCC country

QSLs Received

Note. W=week, M=months, YRS=years, FM=from, MGR=manager and his call, OP=operator and/or callsign.

Direct cards:

XQ0X 912 W FM MGR CE3ESS), TJ1YL (6 W FM MGR FRENCH DX FOUNDATION) ET2A (7W FM MGR WA2NHA), KD7P/NH7 (3W FM OP KD7P/KH2), FP/KH21 (7W FM OP JK1KRS), ST0DX (7W FM MGR WA2NHA), 3DA0BX (7W FM OP).

Thank You

A big thank-you to all my supporters for their assistance, but especially many thanks to. VK2APD, VK2SG, VK3DD, VK3JJ, VK4CPA, VK4DA, VK4JWW, VK4OH, VK4MZ, VK6PY, VK9NS, 3D2XV and the following publications, *QRZ DX, The DX Bulletin, DX News Sheet*

Good DX and 73 ar

POUNDING BRASS

Gilbert Griffith VK3CQ
7 Church St Bright 3741

More on Learning to Communicate

Most confirmed morsiacs will be aware of the many advantages of the CW mode. What are the advantages of Morse? As well as its effectiveness, the narrow bandwidth of Morse uses the radio spectrum most efficiently, allowing parallel contacts to take place within a small spectrum space. This is a great advantage in crowded band conditions. Morse is a truly international language which enables two-way communication between amateurs who would otherwise be unable to understand each other. Also, Morse needs only very simple transmitters and receivers, in contrast to the increasing complexity of equipment using other modes. So, through Morse, youngsters and others with limited resources can enjoy and learn about radio communication. Other advantages include the ability to transmit intelligence through bad conditions, using lower power, than typical voice modes. You can think of many other advantages yourself, and perhaps a survey of them could be conducted with the aim of deciding which are the most important.

To employ these advantages requires a certain amount of self-training and dedication in order to acquire unique skills. Those of you who have been following the guidelines set out in my May column will be aware of the work involved, and should have acquired many skills already. Regrettably, there are many people today who would rather spend their time and effort in trying to change the rules, not realising that the constructive effort of learning will reap more benefit than any they would get from a "cornflake packet" licence.

Well, just how are you going? With two months of operating, most beginners will have no trouble now with initiating a contact, and should be more than proficient at a simple "standard" contact. You should also be able to handle a longer conversation-style of QSO, making only occasional notes. You CAN'T? If not, I'm afraid you haven't been practising, which explains why I've heard so few on air in the evenings; or is everyone practising in the daytime?

Really, two months is only enough to scratch the surface; it takes me that long to read the rig manual. Or at least to understand it. But by now you should at least know how to run full break-in on your own rig, even if you haven't tried it as yet. It pays to experiment with different settings, and if you can stick with a regular friend who you can contact any time on air, the two of you can experiment together without the need to learn a new operator's habits each time. I had one particular friend on air, who I could call up every evening to have a chat, and then could try out antennas, keys, keyers and even rigs on him, knowing that he would understand what I was doing and respond appropriately.

Remember the most important three rules: 1. The right frequency. 2. Listen, and 3. Think before you send. Getting the frequency right will involve learning all you can about your equipment, and then practising enough so that you have confidence in your ability. Listening is the main point of the so-called "standard procedures" and "gentlemen's agreements", when you decide what power and speed to use with the conditions at the time. Even the more experienced operators could do with a little practice in this area, with special regard to the speed in use by those on the frequency.

There is little point in barging in on a station which is working a dogpile of DX, if you want to have a long chat. If you do, you will be disappointed. Conversely, breaking in on a two-way conversation is not polite, if you are chasing contacts in a contest. (Even if it is a good way to get two points!) Use common sense before you transmit. There are so many no-nos that it is impossible for me to list them all; but my pet peeve used to be a regular

occurrence while contesting I would be contacted by a really slow operator who did not realise there was a contest on at the time, who did not know how to give "numbers", who wanted a chat, and who wouldn't leave the frequency! I would like to make a list of peeves, so feel free to write down yours and send them to me. I am sure everyone would like to compare notes and have a good laugh, and newcomers would see some of the pitfalls rather than experience them first-hand.

By following standard procedures well, you can take pride in the fact that the people listening will be learning from you. Other operators will enjoy talking to you, and you will make many more enjoyable contacts. Don't be shy in giving praise to others whose style you admire. They may be fast and accurate, or easy to copy; if you like their Morse, say so. Conversely, if someone is off in frequency, or too fast for you, they will appreciate it if you tell them. It is not much good pretending you can copy bad spacing; be polite, but tell them to slow down That's QRS not QRN There are Q codes for some, and old (but good) Z codes for others

QRG Your exact frequency is . . . . kHz
QRH Your frequency varies
QRI Your note varies
QRK The intelligibility of your signals is (1 to 5)
QSW?Will you send on . . . kHz or MHz?
ZCK Check your keying
ZCL Transmit your call letters intelligibly
ZDM Your dots are missing
ZSU Your signals are unreadable

Here are a few quick guidelines; practise them as much as you can.

Don't send "R" if you didn't copy or read the whole over.

It is only required to identify every 10 minutes; merely send "de VK3CQ" as appropriate at the start or end of an over when you notice that 10 minutes has elapsed.

It is certainly not necessary to send BOTH callsigns at the start and finish of every over.

If you are rag-chewing and wish to over, merely send a full-stop and a "K".

If you are on a net, send the next station's callsign, followed by your own.

You should have a list of stations in their order in the net.

Experiment as much as you can, try lowering the power output as you send, and ask for a report of the results

Make your goodbyes short and sweet.

Feedback Required

Send me a list of what you think are the advantages of Morse over other modes, in their order of importance.

Send me another list of the things that annoy you on air, arranging the list so that the most annoying is on top and the least annoying on the bottom.

It might help if you mark the level on your list where you swear, switch off, or smash your rig to bits.

You can send packet messages to me VK3CQ @ VK3EEE or by mail QTHR. ar

KNUTSHELL KNOWLEDGE

GRAHAM THORNTON VK3IY

A brief overview of what other magazines have to say. All of the items given below are available in the Executive Office Library. As a special service to **Members Only**, a photocopy of any complete article is available for $2.50 posted. To circumvent any copyright problems, please be sure to state - 'The information is required for the purpose of private study'. Address your request to 'The Librarian, Executive Office WIA, PO Box 300, Caulfield South Vic, 3162.'

Amplifiers

Microwave

A Simple and Inexpensive 23/24-Centimeter Signal Combiner. Chip Angle N6CA, QST vol LXXV No 4 April 1991 pp 28 - 30. il cct, diags and photos. A 1.5λ circumference ring acts as a hybrid splitter and combiner, enabling a single source to be split into two amplifiers and subsequently combined to give 3dB gain over a simple amplifier. Both sum and difference outputs are available to simplify adjustment. Six rings and four amplifiers can give a 6dB improvement over a single amplifier.

Small Signal

The basic Transistor Amplifier. Peter Phillips, EA vol 52 No 5 May 1991 pp 100 - 103. il ccts. An educational dissertation containing information necessary to design voltage amplifiers.

Antennas

Magnetic

A Magnetic Loop Antenna for the Low Bands. Roberto Craighero I1ARZ, RadCom vol 67 No 2 Feb 1991 pp 38 - 40. il cct and diags. A 2.5m square rotatable loop is described, constructed of copper tubing. A motor driven vacuum capacitor is used for loop tuning. Energy is inductively coupled into the loop via a coaxial cable bent into a circle. Adjustment procedure is described for obtaining a low SWR in the 50 ohm coaxial feeder. Good results are claimed for 40, 80 and 160m.

Advanced Electronic Applications IsoLoop 14 to 30 MHz Antenna. (Product Review) Doug DeMaw W1FB, QST vol LXXV No 4 April 1991 pp 45 - 46. il photo. An evaluation of this 32" square antenna, including measurements, is presented. It is tuned by a large capacitor located opposite to the coaxial feed point. A stepping motor rotates the capacitor shaft.

Miscellaneous

10 dB on 10 Metres - for Nothing (1). William Skidmore VE3AUI, QSTVE May 1991 pp 3 - 4. il diag. Introduction to a two part article, which deals with the technology of collinear arrays as a preliminary to discussion of Sterba arrays.

The TFH (Top Fed Helical) Antenna. Richard Q Marris G2BZQ, Radcom vol 64 No 4 April 1991 pp 46 - 47 il ccts and diag. A description of a multiband helical antenna 2m long, used vertically and fed at the top with a 10 foot single wire. The use of an ATU is mandatory, and a suitable design is presented. The antenna is usable over the whole of the 80, 40 and 20m bands. The author recommends that the power output should not exceed 25W.

Product Reviews

Butternut HF6V-X Multiband Vertical Antenna. Peter Hart G3SJX, RadCom vol 67 No 3 March 1991 pp 66 - 68 il cct and photos. A detailed description, including theory, of this antenna. A report is included on its performance from three different sites.

VHF/UHF

A Glass-Mounted 2-Meter Mobile Antenna. Bill English N6TIW, QST vol LXXV No 4 April 1991 pp 31 - 34. il cct, diags, graph and photo. The dielectric properties of the windscreen or rear window may be exploited to couple to a mobile antenna, without drilling holes. Brass plates, attached with adhesive, act as capacitor plates. The capacitance introduced, including any from a shortened antenna, may be compensated by lumped inductance. Alternatively, the antenna can be made slightly longer to compensate. In either event, trimming the antenna achieves a satisfactory SWR.

Yagi

Rutland Arrays FO-22 And FO-25 432 MHz Yagi Antennas. (Product Review) Mark Wilson AA2Z and Rus Healy NJ2L, QST vol LXXV No 4 April 1991. An evaluation, with measurements, of these two antennas.

Computers

Hardware

Upgraded RAM-DACs Give Enhanced VGA Graphics. Bill Schweber, EA vol 52 No 5 May 1991 pp 122 - 125. il diags and photos. An application note by Analog Devices describing the use of ADV7141, ADV7146 and ADV7148 RAM-DACs These monolithic ICs are claimed to greatly enhance the resolution, colour rendition and line quality of industry standard VGA displays

Logic Analysers

The Logic Analyser. J L Elkhorne, EA vol 52 No 5 May 1991 pp 126 - 128 il photos A general discussion on the advantages of a logic analyser for troubleshooting microprocessor based equipment.

Software

'Serialtest' - analyse serial data on your PC. - Product Review - Rob Evans, EA vol 52 No 5 May 1991 pp 116 -119. il photos. An application review of a software package available from Advanced Computer Consulting Inc (ACCI). System converts an IBM compatible into a serial data anaylser. The package, including diskettes, manual and special RS-232 cabling is priced at Aust$475.

Filters

A Simple Audio Notch Filter. Dr Paul Stewart G3AEH, RadCom vol 67 No 1 Jan 1991 pp 38 - 39, 59. il ccts, cmp and graphs. A design for a notch/bandpass switched capacitor filter, using National Semiconductor LMF90 IC. Centre frequency is adjusted via VCO 74LS629N; bandwidth is switchable in three ranges. The use of switched capacitor technology ensures good frequency stability with temperature.

Packet

Getting Started in Packet Radio. Clive Smith G4FZH. RadCom vol 67 No 2 Feb 1991 pp 48 - 49. . A Simple introduction to the concepts of packet radio. A description os the equipment necessary is given.

Propagation

Predictions

Midrange Forecasts of Solar and Geomagnetic Activity. Emil Pocock W3EP, and Byron Blake N8LSQ, QST vol LXXV No 4 April 1991 pp 22 - 27, 30. il graphs. A general discussion which highlights the superiority of 30 day forecasts over those of longer prediction. Data analysis procedures are given; this technique is applied to actual test data, and shows the improved accuracy of short-term predictions.

Receivers

Accessories

Variable-tapped balun for HF receivers. Tom Moffat VK7TM, EA vol 52 No 5 May 1991 pp 82-85. il cct and photos. A design for a switched HF transformer to match a dipole with balanced line to a receiver with coaxial input.

Home Brew

The OZ1HWO 144-148 MHz Pocket FM Receiver. Morten Tolstrup OZ1HWO, QEX vol 110 April 1991 pp 7 - 12 il cct, cmps, diags, pcbs and photos A double conversion superheterodyne based on Motorola MC3362 IC. Complete construction details are given. The receiver operates from 2 - 7V, and draws 4mA. The sensitivity for 20 dB SINAD is 0.7 µV.

Miscellaneous

Improving Direct Conversion Receiver Design. Nic Hamilton G4TXG, RadCom vol 67 No 4 April 1991 pp 39 - 44 il ccts and graph. A general discussion on the problems encountered with the practical realization of DC receivers, and the precautions necessary to achieve satisfactory results.

Satellites

Packet

Automated SAREX Communication. Eric L Smitt K9ES, QEX vol 110 April 1991 pp 3 - 6. A description of the application of InstantTrack and Kansas City Tracker/Tuner to the prediction and automatic tracking of SAREX, or any other orbiting body. The application of ProCOMM for control of packet communication is also described. It is claimed that slight modification of TNC parameters increases the chances of a connect under busy conditions.

Technology

An Introduction to Meteor Scatter Operation. Nigel Wilson G4VVZ, RadCom vol 67 No 1 1991 pp 46 - 47. il diags and graphs. The concluding section of a two part article. A general discussion about the techniques necessary for this mode.

Connectors for (Almost) All Occasions - Part 1. David Newkirk WJ1Z, QST vol LXXV No 4 April 1991 pp 35 - 38. il diags and photos. Techniques are given to produce successful results when wiring phone and phono connectors. A simple wiring jig made from clothes pins (pegs) is described.

ESD - Electrostatic Discharge - Part 1. Bryan P Bergeron NU1N, QST Vol LXXV No 4 April 1991 pp 19 - 21. il photos. A general discussion on the mechanism and prevention of ESD damage to semi-conductors. Humidifiers, grounded wrist straps and work mats are recommended as possible solutions, together with anti-static containers and the use of grounded soldering irons. An air ionizer is also suggested to remove static charges from tools and insulators.

How to Lay Out RF Circuits (1). Ian White G3SEK, RadCom vol 67 No 2 Feb 1991 pp 36 - 37. il cct and cmp. An elementary treatment (first of two parts) on how to plan the layout of RF circuits so that the prospect of working first time is enhanced.

How to Lay Out RF Circuits (2). Ian White G3SEK, RadCom vol 67 No 3 March 1991 pp 60 - 61. il diags. Concluding part of article which describes the practicalities of constructing RF circuits. Both 'wired tracks' and 'pin-and-wire' techniques are discussed. Consideration is also given to surface mounting.

Test Equipment

Miscellaneous

A Buzzer Noise Source...and How to Use it. David Sumner G3PVH, RadCom vol 67 No 1 Jan 1991 p 37. il ct and diags. A relay, energized by one of its normally closed contacts, acts as a buzzer producing wide spectrum noise. A coupled tuned circuit may be used to enhance a specific frequency

Simple CRO Adapter tests solid state devices. Ben Takach, EA vol 52 No 5 May 1991 pp 68 - 71. il cct, diags and photos. Lissajous figures are generated by a device which produces two 50 Hz AC signals differing in phase by 90° The two quadrature voltages are applied simultaneously to the vertical and horizontal deflection amplifiers of a CRO, and to the anodes/cathodes, drains/sources or collectors/emitters of the active devices under test. The gates or bases are connected to earth. Modified Lissajous figures, uniquely characteristic for the particular devices, are obtained.

Charts for correct patterns are given, together for those for particular fault conditions. It is possible to use the device to determine the pin connections for any two, three or four terminal semiconductor device.

Probes

Low cost dual mode Logic Pulser probe. Rex Callaghan and Jim Rowe, EA vol 52 No 5 May 1991 pp 62 - 66. il cct, cmp and photos. A logic probe which forces a TTL or CMOS gate into the opposite state temporarily so that the transition may be observed by a normal logic probe. Developed by Dick Smith Electronics, a complete kit is available for $24.95.

Product Reviews

H-P's New 54601A 100 MHz Digital Scope. Jim Rowe, EA Vol 52 No 5 May 1991 pp 88 - 92, 107. il graphs and photos. A detailed review of this new product.

Glossary of abbreviations

il	The article contains illustrations, a list of which follows.
cct	A circuit diagram
cmp	A component layout drawing
EA	*Electronics Australia*
diag	A mechanical drawing
pcb	A master drawing from which printed circuits may be produced
QSTVE	*QST Canada*
RadCom	*Radio Communication*
73	*73 Amateur Radio Today*

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AMSAT Australia
Control: VK5AGR
Amateur check in: 0945 UTC

Sunday Bulletin commences: 1000 UTC
Primary frequency: 3.685MHz
Secondary frequency: 7.064MHz
(7.064MHz is the frequency presently in use)
AMSAT SW PACIFIC 2200 UTC Saturday, 14.282MHz
Participating stations and listeners are able to obtain basic orbital data including Keplerian elements from the AMSAT Australia net. This information is also included on some WIA Divisional broadcasts.

AMSAT Australia Newsletter and Computer Software

The excellent AMSAT Australia Newsletter is published monthly by Graham VK5AGR on behalf of AMSAT Australia and now has about 320 subscribers. Should you also wish to subscribe, send a cheque for $20 payable to AMSAT Australia, addressed as follows: AMSAT Australia, GPO Box 2141, Adelaide 5001.

The Newsletter provides the latest news items on all satellite activities and is a "must" for all those seriously interested in amateur satellites. Graham also provides a Software Service in respect to general satellite programs made available to him from various sources. To make use of this service, send Graham a blank formatted disk and a nominal donation of $10 per item to AMSAT Australia, together with sufficient funds to cover return postage. To obtain details of the programs available and other AMSAT Australia services, send a SASE to Graham.

UOSAT-F Launch Delay

(From AMSAT News Service Bulletin 145.03 from AMSAT HQ, 25 May 1991)

UOSAT has received word that the Ariane V44 launch with UoSAT-F and ORBCOM-X will be delayed for at least several weeks. The following is excerpted from the notification.

"After analysis of recent third stage motor test and flight data Airanespace, along with CNES and SEP, has concluded that a modification should be implemented in order to improve the operating margins of the motor by suppressing an undesirable transient in the H2 feed line during the start-up phase. This transient has been aggravated due to some dispersion in the manufacturing process and has been consequently noted on several past flights.

"The modification involves the introduction of an LH2 pump discharge system downstream of the main H2 feed valve. For this modification, a qualification test program is required and has, in fact, already been initiated, the first results are positive. The test schedule and schedule for hardware modifications to the V44 third stage on the pad would allow a launch of flight V44 in July 1991.

"The V44 payload composite with the ERS-1 and the four microsatellites will be taken off the launch vehicle and transported to S3B. The fairing will be de-mated and ERS-1 reconditioned to be ready for an early July launch."

Mir News

This is the latest news (19 April '91) from Musa U2MIR and Victor U9MIR on Soviet Space Station Mir.

The closer our landing, the more work there is. We are now changing blocks of apparatus

2-Line Orbital Elements 145.AMSAT May 25, 1991

```
DECODE 2-LINE ELSETS WITH THE FOLLOWING KEY:
1 AAAAAU 00   0   0 BBBBB.BBBBBBBB  .CCCCCCCC  00000-0  00000-0 0  DDDZ
2 AAAAA EEE.EEEE FFF.FFFF GGGGGGG HHH.HHHH III.IIII JJ.JJJJJJJJKKKKKZ
KEY: A-CATALOGNUM B-EPOCHTIME C-DECAY D-ELSETNUM E-INCLINATION F-RAAN
G-ECCENTRICITY H-ARGPERIGEE I-MNANOM J-MNMOTION K-ORBITNUM Z-CHECKSUM

AO-10
1 14129U 83 58  B 91138.10904161 -.00000109  00000-0  99998-4 0  6743
2 14129  26.8164 145.1928 6022329 242.7457  44.6724  2.05865438 31622
UO-11
1 14781U 84 21  B 91141.07798147  .00002281  00000-0  41590-3 0   171
2 14781  97.9002 186.9070 0011077 254.4127 105.5848 14.66921087385474
RS-10/11
1 18129U 87 54  A 91141.88184788  .00000090  00000-0  92593-4 0  6531
2 18129  82.9262  78.2958 0010259 259.4239 100.5736 13.72187225195984
AO-13
1 19216U 88 51  B 91121.30113593  .00000118  00000-0  99999-4 0  2712
2 19216  56.8390  87.0967 7167973 253.2812  22.6340  2.09698033 22040
FO-20
1 20480U 90 13  C 91129.94007955  .00000032  00000-0  12038-3 0  2216
2 20480  99.0259 119.3631 0641409  28.2030 334.7299 12.83179903 58657
AO-21
1 21087U          91141.31033519  .00000153  00000-0  14952-3 0   814
2 21087  82.9401 263.6038 0035336 336.3950  23.6581 13.74382818 15339
RS-12/13
1 21089U 91  7  A 91137.90824027  .00000163  00000-0  16217-3 0   812
2 21089  82.9228 126.6640 0030267   6.7432 353.4126 13.73897721 13989
UO-14
1 20437U 90  5  B 91139.72759653  .00000706  00000-0  28353-3 0  3864
2 20437  98.6663 219.3509 0010544 251.9463 108.0536 14.29118862 68929
AO-16
1 20439U 90  5  D 91140.74452842  .00000605  00000-0  25387-3 0  2850
2 20439  98.6717 220.8798 0010316 251.7012 108.3047 14.29205434 69070
DO-17
1 20440U 90  5  E 91137.15617569  .00000715  00000-0  29680-3 0  2832
2 20440  98.6732 217.1507 0010401 252.7018  97.2990 14.29285003 68987
WO-18
1 20441U 90  5  F 91136.23712563  .00000616  00000-0  25769-3 0  2812
2 20441  98.6714 215.2902 0011051 256.9323  93.0595 14.29328365 68297
LO-19
1 20442U 90  5  G 91135.98331718  .00000825  00000-0  28126-3 0  2823
2 20442  98.6713 215.0881 0011268 253.3478  96.6432 14.29405864 68408
NOAA-9
1 15427U 84123  A 91141.30073129  .00000518  00000-0  29856-3 0  7825
2 15427  99.1698 154.1723 0015804 137.3265 222.9137 14.13005072331726
NOAA-10
1 16969U 86 73  A 91138.08819367  .00000740  00000-0  33786-3 0  6300
2 16969  98.5676 161.1067 0014103  25.5480 334.6393 14.24123638241988
MET-2/17
1 18820U 88  5  A 91137.89758054  .00000208  00000-0  17520-3 0  5307
2 18820  82.5401  84.3716 0017994 101.0913 259.2270 13.84482110166490
MET-3/2
1 19336U 88 64  A 91137.78672765  .00000030  00000-0  65848-4 0  7825
2 19336  82.5442  40.7028 0016359 193.9909 166.0762 13.16923284134997
NOAA-11
1 19531U 88 89  A 91137.10306663  .00000644  00000-0  37179-3 0  5336
2 19531  99.0283  91.6596 0013144  65.6984 294.5549 14.12141722136080
MET-2/18
1 19851U 89 18  A 91137.88451758  .00000177  00000-0  14939-3 0  4826
2 19851  82.5219 321.7745 0014644 140.8984 219.3237 13.84133340111869
MET-3/3
1 20305U 89 86  A 91141.03605711  .00000043  00000-0  99999-4 0  3811
2 20305  82.5583 339.7140 0015536 204.0863 155.9519 13.15954785 75381
MET-2/19
1 20670U 90 57  A 91137.88861796  .00000328  00000-0  28517-3 0  2327
2 20670  82.5488  23.1340 0017592  68.9603 291.3435 13.83971347 44787
FY-1/2
1 20788U 90 81  A 91140.58514688  .00000324  00000-0  23866-3 0  1934
2 20788  98.9463 174.6896 0014442 255.3653 104.5910 14.01153837 36340
MET-2/20
1 20826U 90 86  A 91137.91033408  .00000163  00000-0  13949-3 0  1834
2 20826  82.5278 321.9797 0012985 331.3946  28.6495 13.83344374 32025
MET-3/4
1 21232U 91 30  A 91137.77426073  .00000005  00000-0  00000 0 0   223
2 21232  82.5456 245.9829 0017183 126.9351 233.3350 13.15983814  3126
NOAA-12
1 21263U 91 32  A 91140.76038009 -.00000029  00000-0 -48199-5 0   155
2 21263  98.7352 170.3864 0012304 244.6373 115.4525 14.21383733   869
MIR
1 16609U 86 17  A 91141.80322258  .00025579  00000-0  24597-3 0  4825
2 16609  51.6044  61.0485 0005220 198.7546 161.3179 15.66382168301038
HUBBLE
1 20580U          91141.46086867  .00005280  00000-0  55111-3 0  4734
2 20580  28.4714 253.2025 0005565  43.1901 316.9107 14.87708846 56338
```

and are installing new ones in my "radio shack", so now the room is a shocking mess. I have almost stopped working ham radio. My ham radio gear is installed in the "Kvant' module - the astrophysical one. Here is a sketch of our space station. (See next page)

This month we have to go out twice on space walks (EVA).

Our task is to transfer two drives for the solar batteries from module E to module C. The last time we went out we installed special bearings (supports) on module C. The work is rather difficult. For transferring the drives we use a special cargo (load) Shaft G. It is telescopic like some antennas.

Now, about a few rumours:

- We always have a stock of food to last several months, so hunger never threatened us. (And I have remained stout and handsome).
- If the Progress cargo ship had not arrived, there would not be new equipment for subsequent experiments. However, there is still enough food, water, O2, forks and knives.
- About a possible collision: Progress lost radio contact with the station and missed the docking unit. But, for these events, we have some automatic control in the Progress on-board computer to put the cargo ship right back. In addition, at the moment of docking, the crew must be inside the space ship with the hatch closed.

You see, it was not so dangerous.

We succeeded only in exchanging callsigns with STS-37. They had a damaged antenna.

73 ... Musa U2MIR

U2MIR DE-ORBITS

(From AMSAT News Service Bulletin 145.02 from AMSAT HQ, 25 May 1991)

Musa, U2MIR, Bids Earthbound Amateurs Farewell

On USA passes during the afternoon and evening of Friday 24 May 1991, the following came down from the amateur radio packet station on MIR.

U5MIR>CQ FROM 24 05.91 YOU CAN CONNECT WITH U5MIR, PMS: U5MIR-1. U2MIR SENDS HIS BEST 73s TO ALL!!!

U5MIR is the callsign of one of the cosmonauts on the new crew which just arrived last week.

In a packet QSO with students in Australia, Musa indicated that he is not sure whether he wants to go up to MIR again. He has personally logged a year and six months in space (a record) and has been on seven space walks, one for six hours. He is in his early 40s, and with a wife and two children who would probably not mind him being earthbound now! Perhaps he will be heard on the ham bands from a terrestrial QTH in the not-too-distant future.

Change to AMSAT Keplerian Sets

(From AMSAT News Service Bulletin 145.06 from AMSAT HQ, 25 May 1991)

Checksum Feature Added to AMSAT Keplerian Element Sets

As a way of improving distribution of orbital elements, and enhancing the service to AMSAT members, a new feature has been implemented, effective 25 May 1991.

After months of discussion and review with tracking software authors and users, Dick Campbell N3FKV, the AMSAT Orbital Data Manager has published the AMSAT Keplerian Element Set Standard. This document is the explicit definition for the creation of AMSAT format element sets, and should therefore be

New AO-16 Telemetry Equations

HR AMSAT News Service Bulletin 145.07 from AMSAT HQ
Silver Spring, MD 25 May 1991
To All Radio Amateurs BT

The AO-16 command team has revised the telemetry coefficients for Pacsat. Users of TLMDC and TLMDC-II will want to update their PACSAT data files accordingly. The equations which have been updated are for channels Ox1F, Ox20, Ox21, Ox2D and Ox2E.

New AO-16 Telemetry Equations:

NEW AO-16 TELEMETRY EQUATIONS

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SILVER SPRING, MD MAY 25, 1991
TO ALL RADIO AMATEURS BT

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New AO-16 Telemetry Equations:

0	Rx D DISC:	+9.202	-0.08990	0.000	kHz	
1	Rx D S meter:	+0.000	+1.000	0.000	Counts	
2	Rx C DISC:	+9.179	-0.09277	0.000	kHz	
3	Rx C S meter:	+0.000	+1.000	0.000	Counts	
4	Rx B DISC:	+9.837	-0.08838	0.000	kHz	
5	Rx B S meter:	+0.000	+1.000	0.000	Counts	
6	Rx A DISC:	+9.779	-0.09144	0.000	kHz	
7	Rx A S meter:	+0.000	+1.000	0.000	Counts	
8	Rx E/F DISC:	+10.817	-0.09911	0.000	kHz	
9	Rx E/F S meter:	+0.000	+1.000	0.000	Counts	
A	+5 Volt Bus:	+0.000	+0.0305	0.000	Volts	
B	+5V Rx Current:	+0.000	+0.000250	0.000	Amps	
C	+2.5V VREF:	+0.000	+0.0108	0.000	Volts	
D	+8.5V Bus:	+0.000	+0.0391	0.000	Volts	
E	IR Detector:	+0.000	+1.000	0.000	Counts	
F	LO Monitor I:	+0.000	+0.000037	0.000	Amps	
10	+10V Bus:	+0.000	+0.0500	0.000	Volts	
11	GASFET Bias I:	+0.000	+0.000026	0.000	Amps	
12	Ground REF:	+0.000	+0.0100	0.000	Volts	
13	+Z Array V:	+0.000	+0.1023	0.000	Volts	
14	Rx Temp:	+101.05	-0.6051	0.000	Deg. C	
15	+X (RX) temp:	+101.05	-0.6051	0.000	Deg. C	
16	Bat 1 V:	+1.8225	-0.0038045	0.000	Volts	
17	Bat 2 V:	+1.9418	-0.0046890	0.000	Volts	
18	Bat 3 V:	+1.8699	-0.0041641	0.000	Volts	
19	Bat 4 V:	+1.7403	-0.0032880	0.000	Volts	
1A	Bat 5 V:	+1.8792	-0.0042492	0.000	Volts	
1B	Bat 6 V:	+2.0499	-0.0054532	0.000	Volts	
1C	Bat 7 V:	+1.9062	-0.0045331	0.000	Volts	
1D	Bat 8 V:	+1.7536	-0.0033192	0.000	Volts	
1E	Array V:	+8.055	+0.06790	0.000	Volts	
1F	+5V Bus:	+2.864583	4.090715E-2	-1.930042E-4	Volts	<< Rev
20	+8.5V Bus:	+7.720951	+8.25979E-3	-1.76254E-5	Volts	<< Rev
21	+10V Bus:	+8.882535	+1.39771E-2	0.000	Volts	<< Rev
22	BCR Set Point:	-6.1130	+1.1270	0.000	Counts	
23	BCR Load Cur:	-0.0477	+0.00767	0.000	Amps	
24	+8.5V Bus Cur:	-0.00179	+0.000894	0.000	Amps	
25	+5V Bus Cur:	-0.00104	+0.00406	0.000	Amps	
26	-X Array Cur:	-0.00995	+0.00243	0.000	Amps	
27	+X Array Cur:	-0.02370	+0.00254	0.000	Amps	
28	-Y Array Cur:	-0.02220	+0.00273	0.000	Amps	
29	+Y Array Cur:	-0.01810	+0.00259	0.000	Amps	
2A	-Z Array Cur:	-0.02230	+0.00221	0.000	Amps	
2B	+Z Array Cur:	-0.02000	+0.00232	0.000	Amps	
2C	Ext Power Cur:	-0.02000	+0.00250	0.000	Amps	
2D	BCR Input Cur:	-2.103334E-2	+3.382738E-3	0.000	Amps	<< Rev
2E	BCR Output Cur:	-7.146611E-3	-5.247935E-5	4.878499E-5	Amps	<< Rev
2F	Bat 1 Temp:	+101.05	-0.6051	0.000	Deg. C	
30	Bat 2 Temp:	+101.05	-0.6051	0.000	Deg. C	
31	Baseplt Temp:	+101.05	-0.6051	0.000	Deg. C	
32	PSK TX RF Out:	-0.0291	+0.00361	+0.0000869	Watts	
33	RC PSK TX Out:	+0.0055	+0.00172	+0.0001180	Watts	
34	PSK TX HPA Temp:	+101.05	-0.6051	0.000	Deg. C	
35	+Y Array Temp:	+101.05	-0.6051	0.000	Deg. C	
36	RC PSK HPA Temp:	+101.05	-0.6051	0.000	Deg. C	
37	RC PSK BP Temp:	+101.05	-0.6051	0.000	Deg. C	
38	+Z Array Temp:	+101.05	-0.6051	0.000	Deg. C	
39	S band HPA Temp:	0.00	1.0000	0.000	Counts	
3A	S band TX Out:	-0.0088	+0.00435	0.000	Watts	

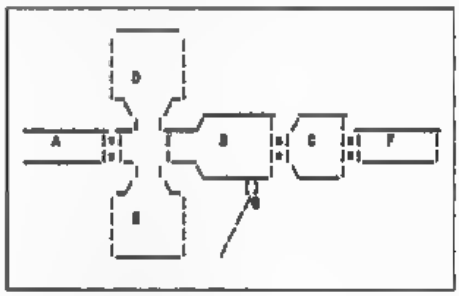
```
10 ' Procedure AMSATCS v1.0
20 ' Orbital Element Checksum Verification
30 '
40 '      by Dick Campbell, N3FKV
50 '      AMSAT Orbital Data Manager
60 '      Copyright 1991
70 '
80 ' Free and unlimited distribution for amateur radio
90 ' and amateur satellite purposes is granted. There
100 'are no warranties, express or implied.  AMSAT-NA
110 'may charge a handling fee for diskette copies.
120 '
130 'This program performs checksum verification of an AMSAT format
140 'orbital element set created in compliance with the "AMSAT
150 'Keplerian Element Set Standard" dated May, 1991.  See
160 'paragraph 4.3 for checksum definition.
170 '
180 'The AMSAT format element set(s) must be contained in a
190 'standard ASCII text file for proper processing.
200 '
210 PRINT" This verifies the checksum of an"
220 PRINT"AMSAT Orbital Element Bulletin File."
230 INPUT"ENTER FILENAME TO BE CHECKED: ",F$
240 '
250 OPEN F$ FOR INPUT AS #1
260 '
270 INPUT #1,L$
280 IF LEFT$(L$,10)="Satellite:"OR LEFT$(L$,10)="SATELLITE:" THEN 290 ELSE 460
290 CS = 0
300 N$ = RIGHT$(L$,LEN(L$)-INSTR(L$,":"))
310 IF LEFT$(L$,9)="Checksum:" OR LEFT$(L$,9)="CHECKSUM:" THEN 400
320 FOR J = 1 TO LEN(L$)
330 P$ = MID$(L$,J,1)
340 IF P$ = "-" THEN CS=CS+1
350 IF P$ = "+" THEN CS=CS+2
360 CS = CS + VAL(P$)
370 NEXT J
380 INPUT#1,L$
390 GOTO 310
400 CH = VAL(RIGHT$(L$,LEN(L$)-INSTR(L$,":")))
410 PRINT
420 PRINT"The Element Set for";N$;" checks ";
430 IF CS=CH THEN PRINT"GOOD." ELSE PRINT "* BAD *."
440 PRINT "Computed = ";CS;"      Checksum = ";CH
450 PRINT
460 IF NOT(EOF(1)) THEN 270
470 CLOSE#1
480 END
```

of benefit to future software authors, element set distributors and end users to ensure consistency and accuracy.

To enhance transmission accuracy, a checksum feature has been added as the last line of each set. This checksum will allow the user to verify that data have been received as created by the AMSAT distributor. Initial tests show that the addition of this line will NOT interfere with current tracking software conversion routines, and it is expected that later releases (of tracking software) would incorporate this verification feature. In brief, the checksum is merely the decimal sum of all numerical characters (and +/-) between "Satellite:" and the beginning of the "Checksum:" line.

A short BASIC listing to check a file of AMSAT orbital elements is included below. Complete details may be found in the AMSAT **Standard**. A hard-copy listing of this program is available from AMSAT HQ for an SASE, as are copies of the **Standard** for interested users. The program has also been posted to the DRIG BBS as AMSATCS.BAS (ASCII file).

Questions or comments about this new feature may be addressed to Dick Campbell, N3FKV via AMSAT HQ, by packet: N3KV@WD5KAL.NTX or INTERNET: n3fkv@tomcat.gsfc.nasa.gov.



Our Space Station

A Cargo ship
B Main module (main controls, main life space-cooking, exercises, Victor's sleeping place)
C Module "Kvant" (my rig is here)
D Module "Kvant-2" (life systems, exit for EVA)
E Module "Kristall" (ovens for technology-semiconductors, etc, my sleeping place)
F Our space ship (very good indeed) **ar**

For satellite Activity March/April see P51

Remember to leave a three-second break between overs when using a repeater

SPOTLIGHT ON SWLING

BY ROBIN L HARWOOD VK7RH
52 CONNAUGHT CRES WEST LAUNCESTON 7250

As I was compiling this month's column, I received a rare QSL card from North Korea. I have heard it over a period of time, and decided to forward a report of its English Language broadcast. It is easily heard on 9977kHz between 1100 and 1150 UTC. Its signal level is usually good, but can fluctuate from day to day. Besides the QSL, I also received a mini-guidebook, a bright banner, a book on the Korean Art Gallery, plus a booklet on political life in this small nation wedged between Japan and China.

I was surprised to get this QSL, as Radio Pyongyang has been very hard to verify, particularly by North American DXers. This nation has adopted a strong anti-American posture since its formation, and this is reflected in its output. So I was glad to get another country confirmed on shortwave, and have resolved to get back into DXing again.

Another major international broadcaster is instituting programming cutbacks in its English language output. Kol Israel in Jerusalem has announced that it is cutting back its English programming to solely North American audiences as from 1 July. This will mean that the 0400 UTC English news from Jerusalem, which is easily heard in Australia, will be axed. It seems a pity, as Kol Israel does give the best coverage of Mid-East news, in my opinion.

The Voice of America has announced that it is moving its HF transmitters from Liberia to Botswana. You may know that Liberia has been plunged into a bitter internecine civil war for the past nine months, without any sign of peace. It was reported that the VOA site at Careysburg was severely damaged in the fighting, and has not been heard of since, sustaining severe damage. The move to Botswana, which is just above South Africa, has also been made, because it is more politically stable than the West African country. The VOA already has a powerful MW sender there, which extensively serves southern Africa.

Also, the BBC External Services has confirmed that it is going to close the Hong Kong Relay site in 1997, because the Chinese would not guarantee it would be free of censorship. Hong Kong reverts to Chinese sovereignty on 30 June 1997. It is rumoured that London is now looking seriously at proposals to co-operate with other international broadcasters in a joint venture to build a facility in south-eastern Asia. Several broadcasters have been thinking of such a site for many years.

One international broadcaster, the Deutsche Welle site in Cologne, has a relay site in Trincomalee, Sri Lanka. Although it is still on, the region is in the thick of the civil war between the Tamil minority and the Sinhalese dominated government. Several times the site has come under attack and was off-air for a time. DW management has been reviewing the viability of the station and the security of the technical personnel.

From 1 July, there will be minor alterations to the HF maritime allocations. In most cases, it will mean only the shifting of channels by a few kilohertz. Yet the Telex and Radphone channel allocations will also increase slightly to cover increased traffic. The Radphone Service of OTC will now be extended to cover the Landmobile Service, as well as ships at sea. Some HF coastal radio stations will eventually close, such as VIH - Hobart Radio, VIR - Rockhampton, which are slated to close on 1 February 1992. VIA in Adelaide will close 12 months later. The eventual plan is to centralise all HF traffic via VIS and VIP, in Sydney and Perth respectively.

Well, that is all the news for this month. Until next time, the very best of listening and 73.

ar

EDUCATION NOTES

BRENDA EDMONDS VK3KT
FEDERAL EDUCATION CO-ORDINATOR
PO BOX 445 BLACKBURN 3130

I have just returned from a visit to the Annual Conference of the NZART, the New Zealand equivalent of our WIA. The arrangement between the two societies is that each attends the other's Annual Convention or Conference in alternate years.

Last year the WIA was host to two New Zealanders, one of whom was Cathy Purdie, the Education Officer. She and I spent considerable time discussing examination devolvement which was just then beginning in New Zealand, so when I was offered the opportunity to follow up on their examination system a year later, I could not decline. I found the trip well worthwhile.

The New Zealand Radio Frequency Service (equivalent to DoTC) has had an entirely different approach to the devolvement. The authority has been given to NZART, and to NZART only, to produce examination sessions, mark papers and submit results to the candidates and the RFS. The appointed Examinations Officer has had to produce the question bank (which was done mostly from questions previously used on official papers which were not kept secret) and the production system. At the moment, examinations are run only twice a year, although there are plans to increase the frequency. Each paper is checked by an assistant, then submitted to the RFS for approval before being used.

The examination sessions are organised by the branches (NZART has over 80 branches) and run simultaneously. Papers are then returned to the Examination Officer for marking and result recording. Only one Theory paper is used, with the candidate receiving a Novice qualification for a lower mark than that required for the equivalent to AOCP. At present the RFS is still examining the Morse code, but it is expected that this will also be devolved very soon.

So far the system seems to be working reasonably well. There are problems similar to ours in that the question bank is too small, and they do not have a formula for the question distribution.

New Zealand has a big advantage over Australia in the large number of Branches so that the whole country can be covered by the Branches for examination purposes. In reality, the Branches function as local clubs, ranging in membership from 5-10 to over 200. Some special interest groups such as VHF groups form separate branches. Each branch has voting rights at the AGM in proportion to its membership.

Two points I found surprising - the small number of Novice licensees (less than 30 total in the Callbook) and the lower average age of members. Cathy Purdie and her group are working vigorously to make amateur radio available and popular in the schools by preparing both educational and promotional materials, and a number of schools have classes and operating stations.

It was also very interesting to note the similarities in the approaches of NZART and WIA. The Morse code debate ranges as extensively there as here, and the discussions on finance, recruiting and preparation of publicity materials had a very familiar ring.

I will be presenting a full report on the trip to Executive, and will be using the information gained in future discussions with both DoTC and Councillors. I hope that the two bodies can continue to increase the co-operation and sharing of both ideas and materials that have been started. 73

ar

FTAC NOTES

JOHN MARTIN VK3ZJC
FTAC CHAIRMAN

New VHF Records

On 15 April, Mike Hastings VK4BFO worked J17DMB, creating a new national 2 metre record of 6763.6 km. The NSW 6 metre record has also been broken again, with a contact between VK2JSR and FC1VYM, a distance of 16,690 km. Congratulations to these new record holders.

New Call Book

It is time again to update the beacon and repeater data base for the next Call Book. Repeater, beacon and packet radio groups - please send any additions or corrections as soon as possible!

50MHz Beacons

Comments would be much appreciated on ways of overcoming the present difficulties in setting up 50MHz beacons in the eastern states. Only two frequencies (50.056 and 50.066) are available at present within the DX window, and both of these are in use outside the eastern states. There are strong objections to using time-sharing for new beacons on these frequencies.

Federal Council have agreed that the 50MHz beacon policy should be reviewed. Likely changes are the dropping of the time-sharing policy and the allocation of extra frequencies - or both.

One alternative is to move eastern state beacons to 50.056 or 50.066MHz without time sharing. This would mean that overseas stations could possibly hear more than one Australian beacon on the one frequency, and eastern state amateurs could have problems in hearing the existing Perth and Darwin beacons.

Another option would be to allot extra frequencies, say 1 or 2kHz away from the existing 50.056 and 50.066 channels, for use by eastern state beacons. This would overcome the problem for overseas stations but would still cause some QRM for those who live near a beacon. However there is no way around this - if there are 50MHz beacons it is inevitable that someone will live near them.

So the question is, how can we establish 50MHz beacons in the eastern states with a minimum of interference? I would like to resolve the situation as soon as possible and would therefore appreciate any advice from 6m operators. ar

REPEATER LINK

WILL MCGHIE VK6UU @ VK6BBS
21 WATERLOO CR LESMURDIE 6076

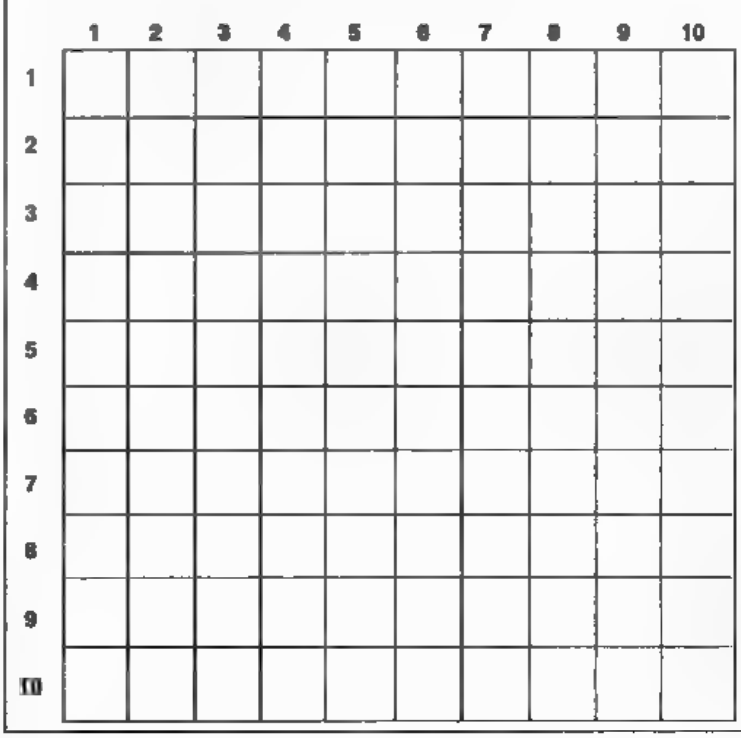
Busselton, a seaside town 200km south of Perth, is the latest site for a 2m pager. I say 2m, because it might as well be in the 2m band. All of 30kHz above 148MHz.

The local repeater users with an input on 147.950MHz wondered what was wrong. Even strong local amateur signals were being desensed, just simply going noisy for about three seconds several times every minute. What was wrong with the repeater?

This type of desensing has no modulation on it. The amateur signal would simply become noisy. A couple of weeks down the log book, all was revealed, Busselton was the proud site of a new Telecom pager. As you can see, the pager is only 80kHz above the amateur repeater's input frequency. Even though the repeater is 15km from the pager, the potential to cause a problem to the repeater is considerable. The problem that the pager is causing to the amateur repeater is, at the time of writing, still under investigation. Pager interference to amateur repeaters can be difficult to solve. Is it intermod or is it RF noise out of the pager? A visit to the site by amateurs from Perth will have to take place. The best attitude is to treat the whole situation as a technical challenge. Previous pager problems in and around Perth have been solved, and so will this one. One such previous pager problem was with a repeater that is co-sited at an amateur's QTH, namely mine. Suddenly, one day our 6750 repeater burst into life with wall to wall pager intermod. The problem was big. Whenever the repeater was in use, it would be punctuated with loud pager intermod. Several days later, the source of the problem was found, another 2m receiver I had returned to service a few days earlier, by connecting an aerial. That's right, the intermod was in this receiver, and was re-radiated via the aerial into the repeater's receiver. Now you would think that the penny would have dropped a lot sooner, but I had eliminated this receiver earlier, because the intermod was still there whether the receiver was turned off. Wrong! It did not matter if the receiver was on or off. As soon as the aerial was removed, so was the intermod. This however was not the end of the story. This repeater has since been changed to a superior design, and guess what? No intermod when the problem receiver was re-connected to its aerial. The obvious lesson: use only the best performance receivers in repeaters. This cannot be stressed enough, in today's high power pager intermod environment. What is the pager problem like in the rest of the country? Perhaps you could let me know about solutions and problems.

A final point on the pager issue, does any one know the situation outside Australia? Are we the only country to have high power transmissions butted right up against a prime amateur band, without any guard band? Learning to live with, and hopefully solve this pager problem, is the only choice, but it would be interesting to know, are we unique? ar

Morseword No 52



Across
1 Neat
2 Stitches
3 Container
4 Tilt
5 Auction
6 Substance
7 Swift
8 Reclines
9 Leases
10 Indian dress

Down
1 Spinnakers
2 Warble
3 Untruth
4 Taxes
5 Perspiration
6 Strokes
7 Became bigger
8 Flag flower?
9 Bottom
10 Pieces

Audrey Ryan © 1991

Solution P 56

DIVISIONAL NOTES

VK2 NOTES

TIM MILLS VK2ZTM

New Council

Some 50 members attended the AGM on 1 June at Amateur Radio House. Nine members had stood for Council. A ballot was not required, and the following major positions were filled at a brief council meeting after the AGM. President: Roger Henley VK2ZIG; Vice Presidents: Terry Ryeland VK2UX and John Martin VK2EJM, Secretary. Bob Lloyd-Jones VK2YEL, Treasurer. Bob Taylor VK2AOE. Other members of Council are Reg Brook VK2AI; Roger Harrison VK2ZTB; Julie Kentwell VK2XBR and Tim Mills VK2ZTM. A future issue of these notes will detail other office bearers and positions. The only agenda item for the AGM was accepted with a slight amendment.

Several hundred QSL notification cards had been returned for inclusion in the handheld draw. The winner was David Parry VK2CDP. The Bureau also benefited by the cross-check the details provided.

Ballot for Two-Metre Handhelds

The NSW Division has a few Alinco 2m handhelds remaining from a membership service offer of a while ago. These are being offered to NSW Division members at $199 each (limit one). Apply in writing (no money at this stage) to Alinco, PO Box 1066, Parramatta NSW 2124. Closing date is Monday 15 July 1991. As demand is expected to exceed supply, a ballot will be conducted. Include a self-addressed stamped envelope with your application. The handhelds are new, in boxes, model number DJ-100T.

HF Relay for VK2WI

The Division until recently had used frequencies which limited coverage mainly to VK2. The success of the 30m transmission and the odd reports on the 10m coverage prompted a move to add further HF coverage. It is planned to use all practical HF bands, and these will be assessed by the use of relay stations on behalf of VK2WI. The first is on 15m on 21.170MHz, morning and evening. Our thanks to Peter VK2NPW. When these notes were compiled, we were still seeking a relay onto 20 metres. Any offers?

Membership Cards

The membership card for this year was included on the inside back cover of the annual report along with the QSL registration card. Several of the membership cards were returned with the QSL card. If yours was one, make arrangements to collect same from the Parramatta office. VK1s perhaps enjoyed reading the VK2 annual report; it was included in VK1 postcodes in the mail-out of May *Amateur Radio*.

WICEN (NSW) Inc

To take advantage of the benefits of incorporation, WICEN in VK2 made the move a couple of years ago in this direction under the charter from the Division to provide WICEN on behalf of the Division. WICEN in VK2 has continued to grow with many active country groups. To allow all groups more active involvement in administration a special general meeting at Wyong in May made the required changes to the 'rules'.

Major exercises over the next few months include: 21 July, Amaroo Car Rally and Sutherland to Surf footrace, both in Sydney; 11 August, City to Surf in Sydney; 24 August, AGM at Parramatta; 7 September, Batemans Bay Car Rally; and 19-20 October, Outward Bound Hawkesbury Canoe Classic.

Gladesville/AUSSAT Test

The next in the series is being planned for late July, with the major theme on material from NASA. Further tests are planned for late September and November. Listen to your local Divisional broadcast for further details.

New Members

Recent new members who joined the VK2 Division included:

K R Attfield	Assoc	Roseville
D A Creelman	Assoc	Epping
B J McMaster	VK2KQH	Sydney
B A O'Neill	VK2MQ	Tumut
A Pace	VK2PTA	Wentworthville
S R Subramani	VK2GDR	Caringbah

A warm welcome is extended to these new members.

ar

5/8 WAVE

JENNIFER WARRINGTON VK5ANW

They Got It Wrong (and it wasn't me!)

Apparently someone gave out the wrong dates for the Hobby Fair; it is to be held on 27 and 28 July, so if you were really disappointed, thinking that you had missed out - take heart - you can still volunteer! We have a marvellous spot centre stage in Centennial Hall, Wayville Showgrounds, thanks to Trevor Colwell of ACBRO (Assoc of Citizens Band Radio Operators). So, if you can help, a member of Council would love to hear from you.

New Council Line-Up

Speaking of council members, here are the 1991/2 members and their positions.

Rowland Bruce	VK5OU	President
Bob Allan	VK5BJA	V Pres, DoTC Liaison & SATAC Co-ord
John McKellar	VK5BJM	Secretary & Education Officer
Rob Gunnourie	VK5FI	Membership Secretary
Don McDonald	VK5ADD	Minute Sec, Examinations Officer & Immediate Past President
Bill Wardrop	VK5AWM	Treasurer & Federal Councillor
Ian Watson	VK5KIA	WICEN, Country Clubs' Rep & Alt FC
Peter Maddern	VK5PRM	Building Supervisor & Program Director
Mark Spooner	VK5AVQ	Assist DoTC Liaison & Assist SATAC* Co-ordinator

Clubs' Reps

Barossa ARC	Ian VK5KIA
Lower Eyre Peninsular ARC	Bill VK5AWM
Darwin ARC	Harry VK5AHH

*SATAC = South Aust Technical Advisory Committee

New QSL Bureau Manager

Alan Roocroft VK5ZN volunteered his services, and has been co-opted onto Council as the new QSL Bureau Manager. Like Rowland before him, he will be excellent in the job, being an avid DXer himself. Thanks, Alan, the world needs more like you.

If you would like to contact Alan you can write to him c/- The QSL Bureau, PO Box 10092, Gouger St, Adelaide 5001.

If you haven't been to a monthly meeting lately, you might notice a few changes. The clock has been repaired and now keeps good time thanks to John Butler VK5NX. Attendees now wear smart new name tags, so that you can match the face to the callsign! (It is even rumoured that there might be a door prize or name-tag draw).

Whether you are a very new member, or just one who hasn't been to a meeting in a while, do come along. You can pick up your QSL cards, buy components from our well-stocked equipment supplies, or buy publications from our Publications Officer, Ian Watson VK5KIA.

Meetings are held on the fourth Tuesday of each month (except Dec) at 7.45pm in the Burley Griffin Building, 34 West Thebarton Rd, Thebarton. And, where there is a fifth Tuesday in the month, we hold a Buy and Sell meeting where members can sell their "pre-loved" gear (and buy someone else's).

Diary Dates

Tues 23 July

Ian Hunt VK5QX will give his talk and video on the USA, Alaska, and through the Pacific, which was postponed from June.

Tues 30 July

Buy and Sell night.

ar

QSLs FROM THE WIA COLLECTION

KEN MATCHETT VK3TL HON CURATOR WIA QSL COLLECTION
PO BOX 1 SEVILLE VIC 3139. PHONE: (059) 64 3721

The International Red Cross

In this series of articles on various themes depicted on QSL cards, the writer has given an account of the Olympic Games created by one man, Baron de Coubertin (see "QSLs of the WIA Collection *AR* June and July 1990) and that great institution, The Boy Scout Movement founded by Baden-Powell (See "QSLs of the WIA Collection" in *AR* Jan and Feb 1991). To complete the trilogy is Henri Dunant, who was instrumental in establishing the International Red Cross. Born in 1828 at Geneva, the young Swiss had witnessed the horrific suffering of soldiers at the Battle of Solferino in 1859 between French and Austrian forces. The casualties of the battle between cannon and horsemen are said to have reached 40,000. For a young banker who came from a society that was protected from such events, the terrible experience had a marked and lasting effect upon his life. He wasted no time in establishing a temporary hospital in a nearby church to give care to the wounded and dying. Returning to Geneva, and determined to do something about the situation, he wrote of his experiences in a book entitled *Un Souvenir de Solferino*, published in 1862. It had far-reaching effects.

The next year, together with four prominent Geneva citizens, Dunant decided to create the "International Committee for the Relief of the Wounded" (later to become the "International Committee of the Red Cross"). In 1864, the first Geneva Convention was held whose aim was to ameliorate the conditions of wounded in the field of battle. The first national associations were also founded in the same year. The symbol of the Red Cross Movement was a red cross on a white background, the reverse of his beloved Switzerland. In Muslim countries, the chosen symbol of the Movement is a Red Crescent. Red Crescent Societies work together with those of the Red Cross throughout the world, the two symbols standing side by side in international publications. The Franco-Prussian War (1870-71), the Boer War (1899) and the First World War were to test the efficacy of the new Movement. Nearly a half-million prisoners were repatriated through the ICRC, and a similar number were treated for wounds during World War 1. The Movement's activities were even greater during World War 2. Relief food, clothing and shelter programs, the establishment of tracing agencies and repatriation assumed gigantic proportions. The Australian Red Cross celebrated its 75th anniversary in 1989, since it was in August 1914 that the Movement in this country arose out of a public meeting at Government House, Melbourne, called by the wife of the then Governor General, Lady Helen Munro Ferguson.

Originally the Australian Red Cross Society (ARCS) was a branch of the British Red Cross Society, but in 1927 received recognition by the ICRC, being incorporated by Royal Charter in 1941. The National Headquarters of the ARCS is located in Melbourne and, through a series of committees in peace time, is concerned mainly with the Blood Transfusion Service, Health and Safety Education, Youth, International Humanitarian Law, Fund Raising and Finance. One important aspect of the Red Cross in Australia is the work of its Youth Department in each State and Territory. Junior members, especially in schools conduct both camps and fund-raising schemes.

HL0FRC

This QSL is the especially assigned call of the Republic of Korea National Red Cross (Special City of Seoul Charter). It shows the founder of the Red Cross Movement. The WIA Collection also contains the QSLs of some other chapters and branches of the Movement (eg HL0IRC, HL0NRC). Readers will realise that the HL0 prefix is restricted to institutions such as schools, universities, Scouts and clubs.

DL0RZ

This QSL, dated July 1972, was sent to well-known Old Timer "Snow" VK3MR from the German Red Cross. It bears the especially assigned suffix, RZ (Rotes Kreuz=Red Cross). Beside the red cross is the symbol of the City of Berlin. Several Red Cross QSLs with the special DL0 and DK0 prefixes have been issued. The WIA Collection also contains the QSLs DK0DD (Dusseldorf), DL0IX (Neukirchen) and DL0RK (Bonn). Germany is one of the 126 countries in the world having affiliation with the International Red Cross.

ST2FF/ST0

During the past few years, the people of Sudan and the recently formed "Autonomous Southern Region of the Sudan" have been suffering great hardship through both drought and refugee problems. Refugee camps hold hundreds of thousands of people. One of the aims of the two Finnish operators of this DXpedition was to appeal for funds so that the International Red Cross would be able to help these unfortunate people. The QSL shown and dated June 1980 was sent to well-known DXer, Steve VK3OT from the Autonomous Region close to the equator, where the operators, using a 15m quad and 12AVQ antennas, made 9000 QSOs during their few days of operation.

OR4CR

In November 1970, East Pakistan (later to be called Bangladesh) was devastated by a severe hurricane. The Belgian Government decided on a rescue operation and called upon the Belgian Red Cross to assist the Belgian Union of Radio Amateurs (UBA) to handle the radio equipment for the operation. Operations continued through the period November 1970 to March 1971, three Belgian operators, ON4JL, ON5DO and ON4QJ establishing their station at Dacca. The special prefix OR (used also for other Belgian stations abroad such as in Antarctica) was granted, together with the significant callsign suffix, CR (Croix Rouge=Red Cross). The QSL shown was sent in March 1971 to "S K" George Turner VK3GN from the Belgian Medical Relief Mission.

It is strange that Henri Dunant was a name

soon forgotten after his initial steps to found this great Movement. For many years people thought him dead but, in fact, he had been living in necessitous circumstances in an almshouse in Heiden, having left Geneva in 1867. So involved had he become in seeking support for the Movement that he had neglected his business activities. He became bankrupt. From then on he lived in obscurity and poverty until, in 1895, a Swiss journalist "rediscovered" him at Heiden.

He became a celebrity virtually overnight. Pope Leo XIII sent him his portrait, the Empress of Russia bestowed a small pension upon him, and he received honorary memberships to several societies. But, perhaps his greatest honour was to be the co-winner of the first Nobel Prize for Peace (1901).

Yet again was he destined to lapse into virtual obscurity. Storm clouds were over Europe and Dunant was again quickly forgotten.

He died on 20 October 1910, aged 82, at Heiden in the same almshouse in which the world had found him. His grave is in Zurich.

Whether a member of the WIA or not, you the reader, can play a part in the Institute's task of establishing a world-class QSL collection which is so useful for radio historians and to save something for the future. Past friends of "Silent Keys" may also assist by approaching the family for their assistance in this regard. Please contact the writer of this series of articles. ar

CLUB CORNER

Townsville Amateur Radio Club

We have received an invitation from the Jiangsu Radio Sports Association to send a fox-hunting team to Nanjing in China early in August this year to compete in the Jiangsu Provincial Radio Ranging Contest.

Other teams taking part are from the cities of Nanjing, Zhenjiang, Changzhou, Suzhou, Lianyungang, Huayang, the Southeast University, the Nanjing Post and Telecommunications College and JARL Aichi Branch. The Townsville team is Ray VK4LU, Ken VK4QZ, John VK4AFS and Wally VK4DO leader

WALLY WATKINS VK4DO

Riverland Amateur Radio Club Two Years Old

The Riverland Amateur Radio Club has just celebrated its second birthday

Having had its inaugural meeting in May 1989, it has now approximately 25 members, who are enjoying several social events, evening visits and addresses.

The club is always looking for new ideas to interest its members. The end of March saw a good response to an evening at the St John Ambulance communication centre at Berri.

At the monthly meeting of the club on 4 April, Geoff Stevens from DoTC in Adelaide addressed the meeting on the subject of interference to radio and television. Geoff answered many questions at the end of his address, with particular emphasis on the interference from paging systems on the 2m band, where there does not seem to be any immediate solution

On 18 April, an evening was organised for a tour of the Telecom centre at Berri; members also viewed the microwave dish complex.

Several members of the club travelled to Mildura on 18 May for a buy, sell and swap meeting organised by the Sunraysia Radio Group; Stewart Electronics also had a comprehensive display of goods for sale.

Congratulations to three of our members. John Crozin VK5PJC and Chris Hedger VK5PBI for obtaining their novice calls. Mike MacIntosh VK5KLG for passing 10wpm.

The club will be holding its annual general meeting early in July

The club is also conducting two Slow Morse sessions weekly in conjunction with the WIA (SA)

DOUG TAMBLYN VK5PDT
SEC, RIVERLAND ARC

SILENT KEYS

DUE TO INCREASING SPACE DEMANDS OBITUARIES MUST BE NO LONGER THAN 200 WORDS

We regret to advise the recent passing of:
Mr R J (Bob) Butler VK2SO
Mr Ian W Jay VK3ZB

Ian Walter Jay VK3ZB

Ian was born in Essendon, Victoria, on 7/2/21. He matriculated from Essendon High School. His working life began with the then PMG's Department as a mechanic-in-training in 1938. Ian progressed through the PMG (later Telecom) and retired as Director of Recruiting.

He was a Commissioned Officer in the 1st Australian Beach Signals, 2nd AIF. He served in New Guinea and Borneo, was wounded and returned to Australia and discharged in August 1945.

Ian and his XYL caravanned around Australia. During these many trips, contacts were made via amateur radio with his amateur friends Doug Paine VK3FH SK, Bernie Fayle VK3IW SK, Dick VK3RZ and myself, Ray VK3JI

Ian began his amateur activities on 17/12/53, and was licensed as VK3AXJ (later changed to VK3ZB). He obtained DXCC on phone in June 1981. He was also a member of the RAOTC.

Ian left us on 4/3/91 after a short illness. He is survived by his XYL Louise, and children David, Jenny, Helen and Marg.

Myself and Ian's many friends have had the privilege of having the love and friendship of a wonderful man. In my case this extended for some 45 years. This friendship will never be forgotten.

RAY JEPSON VK3JI
ar

OVER TO YOU

ALL LETTERS FROM MEMBERS WILL BE CONSIDERED FOR PUBLICATION BUT MUST BE LESS THAN 300 WORDS. THE WIA ACCEPTS NO RESPONSIBILITY FOR OPINIONS EXPRESSED BY CORRESPONDENTS.

Need for Code

I have refrained from entering the CW debate as I have not felt strongly enough about the issue to become involved. However, as the debate has been raging in the columns of *AR* for some time and shows no signs of abating, I feel compelled to shove in my oar.

I would like to draw an analogy with another sphere of activity with which I am involved, namely boating, both for recreation (sailing), and professionally as a hydrographic surveyor. In the latter category I am closely involved with various aspects of the maritime industry. In order to operate a boat commercially and, in some states, for recreation, it is necessary to hold the appropriate qualification according to the size of the vessel and type of service.

There are those who maintain that it is not possible fully to understand seamanship unless you can handle a boat under sail in any conditions. Compare this with similar statements that you can only be a competent radio operator if you can use Morse code under adverse conditions. It was once necessary to qualify under sail for any grade of qualification to operate a boat or ship. This is not now necessary, and examinations now reflect current requirements, practices and technology. Nevertheless, many people, including professionals, enjoy sailing as a recreation, and even navigate boats around the world under sail, the ultimate achievement.

Why cannot amateur radio qualifications be considered in the same way? The examination syllabus should be progressively changed to reflect current technology and practices while deleting topics which are no longer relevant. This means replacing such things as proficiency in Morse code with a knowledge of modern data transmission, radio modems and satellites.

If Morse code is dropped as an examination requirement, it should still be permitted for those who are keen to give it a try, just as sailing craft are still permitted on our waterways. This will keep amateur radio qualifications and knowledge of radio up to date but will not prevent those with an interest in Morse code from using it on air.

KEVIN L FELTHAM VK3ANY
PO Box 61
PORT ALBERT 3971

Morse is Ancient

Those blokes who continue to knock Morse code because it is "an archaic mode" please observe the analogy between the use of Morse and the following brief list of activities keenly

followed by enthusiasts for the love, joy or charm of the pursuit.

Model engineering, steam train activities, horse riding, vintage automobile restoration, bi-plane aircraft restoration and flying, archery, cricket, yachting, valve radio restoration etc

We are all aware of the technical superiority of telegraphy over voice in difficult conditions. I do not maintain, however, that any great proficiency in Morse should be a mandatory requirement for HF operation, but rather, those with a proven interest in the code should be allowed unmolested access to the traditional "bottom end" of the HF allocations. Radiophiles who are deaf to the charms of Morse, or cannot learn it (yes, I'm sorry, it does take some effort, and the skill cannot just be bought off the shelf like a transceiver) should nevertheless be allowed access to the bulk of the amateur HF spectrum. Right or wrong, Morse is seen by many as an artificial and irrelevant impediment to their fuller enjoyment of the hobby, and we are obviously losing people who would otherwise make a valuable contribution to the art.

DREW DIAMOND VK3XU
"NAR-MELAN"
LOT 2 GATTERS RD
WONGA PARK 3115

Coded Transmissions

Amateurs use many types of coded transmissions; most require special equipment and technology PLUS near perfect characters and spacing for intelligent results. The most used amateur allocations are between 1 6 and 30MHz where the transmissions vary with time of day, season and solar cycle. This restricts machines requiring precision interference free pulses. Voice transmissions are limited by the language barrier, to be solved in a future millenium!

Consider a simple code system adapted from railway signalling. It can convey messages in many languages, even Japanese. This versatility has led to its adoption internationally. It has a set of 'short form' messages, Q & Z codes, and many 'common usage' ones. Like ALL message handling it involves a degree of mental and manipulative skill. It is not patented and can cope with many of the interference problems that restrict complex systems. This is a GIFT, available to overcome the complications of 'advanced methods'. Contact can be established around the world, conditions permitting, with a simple CQ. 50 years ago it had the ability to pass traffic at 120wpm!!

The ITU is sound in retaining our most basic communication method. Don't miss out on joining, to date, the only world 'language'. This code, if sent by hand, is as personal as handwriting, more individual than mere communication.

Every worthwhile advance on LF, MF or HF was pioneered by CW including the frequency stability that made SSB possible! It is the method of 'last resort'. Serious HF communicators should not miss acquiring a modest proficiency in this invaluable method and USING IT. Readability is more important than speed; five wpm may not sound much but it will convey every important message you are likely to transmit including distress ones. Remember, the faster you send, the fewer people can copy it.

ROBERT R.MCGREGOR VK5XZ
2 WILTSHIRE DRIVE
SOMERVILLE. 3912

Stop Pirates

I would like to see the WIA set up a register of companies and retailers who in the interest of amateur radio will not supply un-licensed persons with amateur transmitting equipment.

To qualify a company to be listed on such a register, the management must sign an undertaking "that they or any member of their staff will not supply amateur transmitting equipment to any person unless a current operator's certificate (with photo) is produced at the point of sale".

Such a register could be published in AR each month. It would then be up to hams to support these companies and blacklist the rest. I realise that this could cause some inconvenience for some people (mail orders etc) but perhaps a photocopy of your licence could be used. Anyone "lending" their certificate for mail order to an un-licensed person doesn't deserve a licence and should have it cancelled by DOTC if proven.

Let's make it as hard as possible for pirates to wreck our bands, and keep what band-space we have left. Look what happened to 27 MHz.

A J GILCHRIST VK5BWG
P O BOX 1337
STIRLING NORTH 5710

Call Signs (A thing of the past?)

Over the last few years I've noticed a trend by amateurs in their operating procedure., I've been doing a fair bit of travelling for a while now and so I hear probably a broader cross section of skills than most. This comment mainly refers to the slang call signs used by quite a few amateurs particularly when they are on VHF/UHF repeaters. The DOTC licenses all of us with a VK (call area) and then either two or three letters, eg VK4CRR etc However, some think that they can just use the last letters eg 4CRR or even just CRR whilst chatting locally on repeaters Occasionally I even hear this practice used on the 80m band.

If this practice is not stamped out we may as well resemble the AM 27MHz band and give ourselves a call sign like "Big Ben" or "Smoky Sue"!

BILL HORNER VK4CRR
26 IRON STREET
GYMPIE 4570
ar

Satellite Activity for March/April 1991

1. LAUNCHES

The following launching announcements have been received:

Intl No	Satellite	Date	Launch Nation	Period min	Apg km	Prg km	Inc deg
1991-							
023A	COSMOS 2138	26 Mar	USSR	89.6	369	175	67.2
024A	ALMAZ-1	31 Mar	USSR	88.7	280	170	72.7
025A	COSMOS 2139	04 April	USSR	676.0	19148		64.8
025B	COSMOS 2140	04April	USSR	676.0	19148		64.8
025C	COSMOS	2141	04April	USSR	676.0	19148	64.8
026A	ANIK E-2	05 Apr	ESA	1090.7	35748	21693	0.2
027A	STS-37	05 Apr	USA	93.8	465	449	28.5
027B	GRO	05 Apr	USA	93.7	463	449	28.5
028A	ASC-2	13 Apr	USA	656.1	35920	1348	22.5
029A	COSMOS 2142	16 April	USSR	105.0	1031	983	83.0

2. RETURNS

During the period 40 objects decayed, including the following satellites:

1980-053A	MOLNIYA 1-47	01 Apr
1989-079A	COSMOS 2046	06 Apr
1990-096A	COSMOS 2103	03 Apr
1991-008A	COSMOS 2124	07 Apr
1991-011A	COSMOS 2134	01 Apr
1991-016A	COSMOS 2136	20 Mar

BOB ARNOLD VK3ZBB
ar

HF PREDICTIONS

Roger Harrison VK2ZTB
The Apogee Group

As from last month, the charts are now produced using the **new software** Graph-DX giving estimates *directly in signal strength*. The reference signal strength (0 dB) is **1 uV in 50 Ohms**, which is between S3 and S4, if your S-meter is calibrated such that S9 is 50 uV and the lowest detectable signal is 0.1 uV (see Ref.1). Last issue, I also included three graphs, produced using Graph-DX, showing forecast propagation on 14 MHz to Bering Is (55 N, 165 15 E); a DXpedition is scheduled to be there from 27 July to 16 August. The caption "went missing", so the graphs are reproduced again (Figure 1), this time with the caption.

Six metres

Graph-DX also provides coverage of six metre propagation, too. For a 'taste' of what to expect this equinox, Figure 2 shows graphs for two paths: VK East to Tonga, and Nth Qld to JA. The signal strength scales, note, are in dBm. On VHF, the S-meter 'standard' is different to HF, S9 being 5 uV (-93 dBm), which makes S4 -123 dBm (see Ref.1). The ionospheric 'model' and signal strength calculation used in Graph-DX do not take 'special' propagation modes, such as TEP, into account. For these graphs, I assumed Tx power of 200 W and 4-ele Yagis. I'd be interested in any reported results. <hold> Ref.1. *Signal Strength, "S" Meters and Preamps*, Gordon McDonald VK2ZAB, AR, July 1990, p.14.

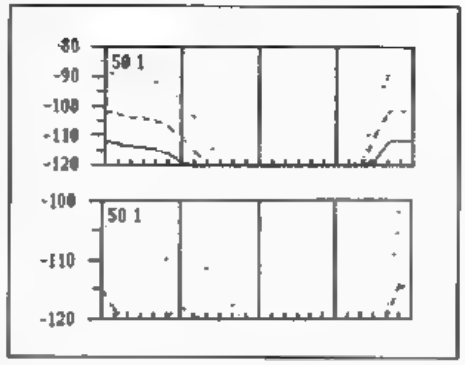


Figure 2. Some 6m forecasts, for September. Top chart: VK East to Tonga; Bottom: Nth Qld to JA. Solid line 90% of days, dashed line 50% of days, dotted line 10% of days. Signal strength in dBm. S9 is -93 dBm, S4 is -123 dBm.

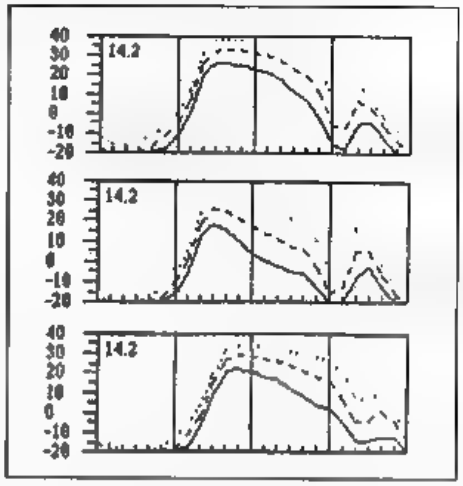


Figure 1. 14 MHz signal strength predictions for the Bering Is DXpedition, July-August. Top chart: VK East, then VK South, with VK West at the bottom. Solid line 90% of days, dashed line 50% of days, dotted line 10% of days. S9 is 34 dB, S1 is -14 dB.

ar

VK EAST - MEDITERRANEAN

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	19.0	8	18.1	-3	7	8	5	0
2	19.8	2	14.8	-15	0	5	2	-1
3	22.1	1	16.4	-27	-6	0	2	0
4	25.0	2	18.8	-36	-11	-2	2	2
5	26.8	3	20.6	...	-15	-5	2	3
6	27.4	3	21.4	...	-14	-5	2	3
7	27.8	3	22.1	-37	-11	-2	2	3
8	26.9	3	20.4	-29	-7	0	3	2
9	23.6	3	17.8	-20	-2	2	2	0
10	20.4	3	15.4	-11	1	3	0	-5
11	17.4	3	13.2	-2	3	2	-4	-13
12	15.2	4	11.4	3	4	-1	-11	-24
13	13.5	8	10.2	8	3	-5	-19	-36
14	12.7	13	9.5	12	2	-9	-27	.
15	12.4	20	9.4	15	2	-11	-32	..
16	12.2	25	9.2	19	3	-13	-36	
17	12.2	27	9.2	20	3	-14	-37	
18	11.0	30	8.4	16	-4	-24	. .	.
19	9.5	32	7.3	8	-17			.
20	9.2	32	7.1	6	-20			
21	12.9	29	9.7	24	7	-9	-31	.
22	19.6	22	15.1	33	26	18	7	-5
23	18.5	20	14.0	23	20	13	6	-5
24	21.1	5	16.1	11	16	15	11	4

VK STH - MEDITERRANEAN

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	20.0	14	15.2	11	15	13	8	0
2	19.8	7	14.9	-3	6	7	4	-1
3	22.2	4	17.4	-18	-1	3	4	1
4	25.3	4	19.2	-29	-7	1	4	3
5	27.1	4	21.0	-36	-10	-1	4	4
6	27.6	4	21.7	-38	-11	-2	3	4
7	28.0	5	22.4	-37	-11	-1	4	5
8	28.7	3	21.5	-30	-7	0	4	3
9	25.4	3	19.1	-22	-3	2	3	1
10	21.2	3	15.9	-12	0	3	0	-4
11	17.2	1	12.9	-4	2	0	-6	-15
12	13.8	1	10.3	1	1	-5	-17	-32
13	11.4	2	8.5	4	-4	-15	-34	.
14	9.9	7	7.3	3	-12	-29	.	..
15	9.3	17	6.9	3	-18	.	.	
16	9.6	25	7.1	6	-17	.	.	
17	10.1	27	7.5	9	-14	-36	.	
18	10.5	29	7.9	12	-10	-32	.	.
19	9.8	30	7.4	9	-17	.	.	.
20	9.0	31	6.9	3	-25	.	.	.
21	8.9	31	6.9	2	-27	.	.	.
22	11.7	29	9.0	18	-2	-21	.	.
23	14.3	27	11.1	27	14	1	-17	-36
24	19.0	19	14.4	25	21	14	5	-6

VK WEST - MEDITERRANEAN

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	18.5	19	14.1	23	20	14	5	-6
2	18.3	11	13.8	7	11	8	2	-7
3	20.4	5	16.1	-7	4	5	3	-2
4	23.2	5	17.6	-17	0	4	4	2
5	24.9	4	19.2	-24	-4	2	4	3
6	25.3	4	19.9	-28	-6	1	4	3
7	25.7	4	20.5	-29	-7	0	4	3
8	27.0	4	21.7	-28	-6	1	4	3
9	26.7	3	20.2	-23	-4	2	3	1
10	24.2	3	18.3	-14	0	4	3	-1
11	20.7	4	15.8	-5	3	4	0	-7
12	17.5	5	13.2	2	4	1	-7	-18
13	14.5	7	11.0	7	3	-5	-19	-35
14	12.4	10	9.4	8	-2	-15	-35	.
15	10.9	17	8.2	8	-10	-29	. .	.
16	10.2	24	7.7	7	-16	-39	. .	.
17	10.3	26	7.8	8	-16	. .	.	.
18	10.4	28	7.8	9	-15	-39	.	..
19	10.6	29	8.0	11	-13	-37	.	. .
20	9.7	30	7.4	5	-25	. .	. .	. .
21	9.6	31	8.6	-4	-37	. .	. .	. .
22	8.4	31	8.5	-6	.	. .	. .	. .
23	11.5	28	8.8	16	-6	-27	.	. .
24	16.6	25	12.7	31	20	9	-6	-22

VK EAST - EUROPE L.P.

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	19.3	16	13.1	15	17	15	8	2
2	18.4	18	12.6	18	18	15	8	0
3	17.6	20	12.0	21	19	14	7	-2
4	16.6	23	11.5	26	21	15	5	-5
5	16.9	23	11.7	26	21	15	6	-5
6	17.3	23	12.0	27	22	16	7	-3
7	18.6	21	13.0	25	22	17	9	0
8	16.9	14	12.6	16	15	7	-2	-14
9	13.6	5	10.0	6	4	2	13	-27
10	11.2	-8	8.3	0	-1	-8	-20	-35
11	9.7	-23	7.2	-2	-3	-10	-22	-37
12	9.2	...	6.7	13	12	-19	-31	...
13	9.4	.	7.0	23	19	24	-36	...
14	9.8	.	7.2	-29	22	26	36	...
15	10.1	. .	7.5	33	24	26	-35	...
16	9.4	.	7.1		34	37	...	...
17	8.7	.	6.6				.	.
18	8.5		6.5				...	.
19	11.1	.	8.1	-24	-14	-15	-23	-34
20	16.0	-9	12.3	-16	-4	-2	-5	-11
21	21.2	2	14.8	-16	-1	2	2	-1
22	20.9	8	14.3	-5	6	8	7	3
23	20.6	12	14.1	5	12	12	9	4
24	20.0	15	13.6	11	15	14	10	3

VK STH - EUROPE L.P.

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	17.8	13	12.3	10	13	11	5	-2
2	17.0	17	11.8	17	16	12	4	-5
3	16.4	20	11.5	21	18	12	3	-8
4	15.7	23	11.1	25	19	12	1	-12
5	15.9	24	11.3	27	20	13	1	-11
6	16.2	23	11.5	25	20	13	3	-9
7	17.3	22	12.4	25	20	14	5	-6
8	16.1	14	12.6	15	11	4	7	-21
9	13.0	6	10.1	6	2	-6	-20	-36
10	10.9	-5	8.5	1	-3	-12	-27	...
11	9.7	-16	7.5	0	4	-13	-28	..
12	9.4	-33	7.2	-8	10	17	-32	...
13	9.6	...	7.5	-19	-18	24	-38	..
14	9.8	...	7.5	-30	25	30	...	..
15	10.0	...	7.7	-39	-31	35	...	...
16	9.3	...	7.2	..	..	..	...	...
17	8.7	...	6.8	..	..	..	...	...
18	8.5	...	6.7	..	..	..	...	...
19	10.3	..	7.9	.	-38	..	..	...
20	14.0	-20	11.2	19	-6	5	-8	-15
21	18.2	-6	14.0	-25	-8	-3	3	-7
22	19.6	-2	13.7	-24	-6	0	0	1
23	19.1	2	13.3	13	0	3	2	-3
24	18.5	8	12.9	0	8	8	4	-1

VK WEST - EUROPE L.P.

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	17.1	2	12.0	-3	3	5	-1	-7
2	16.3	7	11.5	4	7	5	-1	-10
3	15.8	9	11.2	8	9	6	-2	-12
4	15.2	12	10.8	12	10	6	-4	-15
5	15.4	13	11.0	13	11	6	-5	-14
6	15.7	14	11.3	14	12	7	-2	-13
7	16.7	14	12.1	14	13	8	1	-9
8	17.9	14	12.9	13	14	10	4	-4
9	18.3	10	13.3	9	10	7	0	-9
10	15.9	3	12.4	1	3	1	-9	-20
11	12.8	-7	9.9	-3	-2	-7	-17	30
12	10.8	-19	8.3	-5	-5	-10	-21	-34
13	9.6	...	7.3	-17	-16	22	-35	.
14	9.3	...	7.0	-33	-29	-35	.	.
15	9.4	...	7.4	...	-36			.
16	9.6	..	7.3	...	..	.		
17	9.9	...	7.5		.	.		
18	9.2	...	7.1					
19	8.5	..	6.6	. .		.		
20	8.4	. .	6.6					
21	10.2	...	7.7		-34	36		
22	14.0	19	11.1	-18	-7	6	10	-17
23	18.3	-6	12.9	-21	-7	-3	-4	9
24	17.7	-3	12.5	14	2	0	-1	-6

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	10 0	6	7 9	5	-8	-24	..	..
2	9 5	-3	7.3	2	-8	-21	...	...
3	9.1	-12	7.0	0	-9	-21	...	...
4	13.1	-2	10.2	0	0	-5	-16	-30
5	20.9	5	16 2	-6	3	5	1	-4
6	27 9	5	21 5	-10	4	8	8	5
7	26 4	5	19 7	-9	4	7	7	3
8	23 4	6	17 5	-2	7	8	5	0
9	18 6	6	14 6	1	6	5	0	-8
10	15.8	6	11 9	4	5	0	-9	-21
11	12.8	4	9 5	5	1	-7	-21	-39
12	10 7	5	7 9	5	-4	-18	-37	..
13	9 3	9	6 9	4	-12	-29	.	..
14	8.9	20	6.5	5	-16	-38	.	...
15	9.1	27	6.7	8	-15	-38	.	..
16	9 5	30	7 0	10	-13	-35	..	..
17	9.4	31	7 1	9	-15	-39	..	..
18	9 0	33	6 9	7	-18	.	.	.
19	8 4	34	6 4	4	-23	.	.	.
20	8 3	34	8 4	3	-25	.	.	.
21	9 6	32	7 4	11	-15	-38	.	.
22	9 0	30	6 9	6	-19	.	.	.
23	8 3	20	6 5	1	-23	.	.	.
24	8.2	8	6 4	0	-21	.	..	.

VK EAST - AFRICA

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	30 3	12	24 4	0	12	16	16	14
2	29 2	11	24 0	-3	10	14	15	12
3	28 7	11	21 8	-3	10	14	14	11
4	28 7	11	23 3	-2	11	14	14	12
5	29 0	12	23 4	0	13	16	15	12
6	29 8	10	22 8	5	15	17	16	12
7	28 2	11	21 6	13	19	19	16	11
8	25 7	14	19 5	24	24	21	16	8
9	23 4	17	17 9	33	28	22	13	3
10	21 0	18	16.0	36	27	19	8	-7
11	18	21	14 5	35	24	13	-1	-17
12	17 8	22	13.3	35	20	7	-9	-28
13	16 6	23	12 6	31	17	3	-15	-36
14	15.8	23	12 1	30	14	1	-22	.
15	14 9	24	11 3	27	9	-7	-30	.
16	14 3	24	10 9	25	6	-11	-36	.
17	12 5	26	9 6	17	-6	-28	.	.
18	10 5	27	7 9	2	-20	.	.	.
19	9 8	28	7 6	-2	-37	.	.	.
20	14 1	24	10.7	24	5	-13	-38	. .
21	20 6	20	16 0	31	25	18	8	-4
22	27 0	16	20 9	18	23	23	19	14
23	3 0	14	24 4	10	19	21	20	17
24	31 8	12	24 9	3	15	18	18	15

VK EAST - ASIA

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	34 3	21	25.8	30	34	34	32	29
2	33.7	22	25 4	30	35	34	32	29
3	35 2	22	25 1	32	36	35	33	29
4	32.4	23	24 5	35	37	36	33	29
5	30 6	25	23 1	41	40	38	33	28
6	28 1	28	21 2	49	44	40	34	27
7	24.6	30	18.8	49	43	37	30	21
8	21 3	33	16 1	48	40	35	23	12
9	18 2	35	13 7	45	36	27	14	1
10	15 9	38	11 9	43	31	19	4	-10
11	14 1	40	10 5	39	25	12	-4	-22
12	13.1	41	9.7	37	21	7	-11	-30
13	12 6	41	9 4	35	19	5	-14	-35
14	12.3	42	9 2	35	18	3	-16	-37
15	12 3	42	9 3	34	18	3	-16	-38
16	11.0	43	8 4	30	11	-6	-27	. .
17	8 5	46	7 3	23	1	-18	..	. .
18	9.2	45	7 1	21	-1	-21	...	...
19	13 1	38	10.2	36	21	7	-10	-30
20	20.8	30	15 6	40	35	29	19	8
21	27 7	25	21 3	37	37	35	30	24
22	32 2	23	24 6	34	36	35	32	28
23	33 8	22	25 7	31	35	35	33	29
24	34 4	21	26 0	30	35	35	33	29

VK EAST - STH PACIFIC

UTC	MUF	dBU	FOT	14 2	18 1	21 2	24 9	28 5
1	26 5	6	21 8	-28	-5	2	6	6
2	25.5	9	20 5	-16	1	7	9	8
3	24 7	13	19 6	0	11	14	13	10
4	24 2	18	19 5	15	20	20	17	12
5	24 3	22	19 3	29	29	26	21	15
6	24 2	23	19 1	37	35	29	22	14
7	23 8	20	18 4	38	32	26	17	8
8	21 3	21	16 2	37	29	22	11	0
9	18 5	24	14 0	35	25	15	2	-12
10	16 3	26	12 3	32	20	8	7	25
11	14.6	27	11 0	29	14	1	-18	-38
12	13.6	28	10 2	26	10	-4	-25	.
13	13.1	24	9 8	21	8	-8	-28	.
14	12 6	16	9 5	14	5	-10	-29	.
15	12 4	9	9 4	8	0	-10	-27	.
16	11 1	-3	8 4	1	4	-15	-32	.
17	9 4	-19	7 2	-2	-8	-19	-36	.
18	9 1	-29	7 0	3	7	-15	-32	.
19	12 9	-15	10 0	9	-4	7	-15	27
20	20 3	-2	15 7	-22	-5	1	2	7
21	26.5	2	20 9	-33	-10	-1	2	1
22	26 8	4	22 0	39	-12	-2	5	4
23	26 7	4	21 8	39	12	-2	3	4
24	26 7	5	21 7	-35	10	0	4	5

VK EAST - USA/CARIBBEAN

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28 5
1	9 7	19	7.4	8	-10	-29	. .	..
2	9.3	10	7.2	5	-11	-29	...	...
3	13.4	12	9.9	12	5	-4	-19	-37
4	21.2	12	16.4	12	14	12	6	-2
5	27.7	8	22.0	3	12	13	11	7
6	29.9	7	24.1	-1	10	13	12	9
7	28.3	7	22.7	-2	9	11	10	7
8	25.9	7	20.6	1	10	11	9	4
9	22.7	8	18.0	4	10	10	5	-1
10	19.3	9	15.1	7	9	6	-1	-11
11	16 0	9	12 5	10	7	0	-11	-25
12	12.9	10	10.0	9	1	-9	-26	.
13	11 0	12	8 5	8	-5	-21	..	.
14	10.1	20	7.7	8	-11	-31	. .	.
15	9.9	26	7 6	9	-13	-35	. .	.
16	10.1	28	7.7	11	-12	-34	. .	..
17	10 0	30	7.7	12	-11	-33	...	...
18	9 8	32	7.4	11	-13	-36	...	.
19	9 6	31	7 4	9	-17	. .	.	.
20	9 0	32	7.0	5	-23	..	.	.
21	8 8	32	6 9	3	-25	..	.	.
22	9 6	32	7.4	10	-14	-37	.	.
23	8 9	30	7 0	6	-20	..	.	.
24	8.8	25	6 9	4	-21	...	.	.

VK STH - AFRICA

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28 5
1	26 6	10	21.5	-5	9	12	12	8
2	26.1	10	21.4	-6	7	11	11	7
3	25 9	9	19 7	-7	7	10	10	7
4	26.2	10	21.7	-6	7	11	11	7
5	26 5	10	21.9	-3	9	12	12	8
6	27.1	9	21.0	1	11	15	12	8
7	25.7	9	19.4	7	14	14	11	5
8	23.0	12	17 4	17	18	15	8	-1
9	19.4	15	14.7	26	19	10	-2	-17
10	16 0	19	12 1	24	11	-3	-22	..
11	13 1	20	9.8	15	-5	-25	.	.
12	11 0	22	8 2	4	-25	..	.	.
13	9.5	24	7.1	-9	.	.	...	..
14	8 9	26	6.8	-17	..	.	.	.
15	9 0	25	6.7	-15	...	.	.	.
16	9 3	25	7 0	-11	...	.	.	.
17	9 7	25	7 3	-7	..	..	.	.
18	9.0	26	6 8	-16	.	..	.	.
19	8 1	26	6 2	-29	.	...	..	.
20	7 9	26	6 1	-31	.	...	..	.
21	10 8	24	8.4	2	-28	.	...	..
22	16.2	9	12 5	11	5	-4	-19	-37
23	22 1	8	17.0	7	11	9	3	-5
24	26 4	8	20 2	1	11	12	10	5

VK STH - ASIA

UTC	MUF	dBU	FOT	14 2	18 1	21 2	24 9	28 5
1	26.8	12	20 2	20	23	21	15	8
2	26 9	12	20 3	21	25	21	16	9
3	26.3	13	19 9	23	24	21	16	8
4	25.0	14	18 9	25	25	21	14	5
5	23.0	16	17 4	30	26	20	11	0
6	20 3	21	15 3	37	27	18	5	-10
7	17.8	24	13 4	35	22	10	-6	-24
8	15 5	28	11 5	30	14	0	-21	.
9	12.8	30	9 6	23	2	-17	.	.
10	10.7	33	8 0	13	-13	-38	.	.
11	9.5	34	7 0	3	-29	.	.	.
12	8.3	35	6.1	-7	. .	...	..	.
13	7.8	36	5 8	-13	...	...	...	...
14	8 0	36	5.9	-10	...	...	...	...
15	8 4	35	6 2	-6	...	...	...	...
16	7 8	36	6.0	-11	. .	.	.	.
17	7 6	37	5.8	-14	...	. .	.	.
18	7 4	36	5 7	-17	...	.	.	...
19	7 3	32	5 7	-18	.	.	.	.
20	9.5	25	7.4	2	-25	.	.	.
21	13.7	17	10 6	16	3	-11	-32	.
22	18 9	15	14.5	21	18	9	-5	-17
23	22 9	13	17.5	21	20	16	8	-1
24	25 4	12	19 3	20	22	19	13	5

VK STH - STH PACIFIC

UTC	MUF	dBU	FOT	14 2	18 1	21 2	24 9	28 5
1	28 3	9	23.5	-26	-3	4	8	9
2	27 3	12	22 0	-11	5	11	12	11
3	26 3	16	21 1	6	15	18	17	13
4	25 6	20	20 5	22	25	24	21	16
5	25 7	23	20 4	33	32	29	24	18
6	25 7	19	19 6	38	33	28	21	13
7	21.9	21	16 3	37	30	23	13	2
8	17 7	24	13 2	34	23	13	0	-15
9	14.1	28	10 5	27	13	-1	-20	.
10	11 6	30	8 6	19	0	18	.	.
11	10 0	31	7 4	11	-12	35	.	.
12	9 3	32	6 9	7	-19	.	.	.
13	9 6	26	7 2	8	-15	37	.	.
14	10 1	14	7 5	7	-9	-27	.	.
15	10 5	5	7 9	5	-6	-20	.	.
16	9 8	-8	7.4	0	7	-20	-39	.
17	9 0	21	6 8	-1	-8	-19	-37	.
18	8 9	-33	6 8	5	9	19	-35	.
19	11 8	-18	8.7	-7	-3	7	17	-30
20	17 4	-5	13 4	-16	-4	2	5	11
21	24 2	1	18.5	-27	-7	0	1	0
22	29 0	3	22 3	-35	-10	-1	3	3
23	28 9	6	23.6	-37	-10	0	4	6
24	28 9	7	23 5	34	8	1	6	7

VK STH - USA/CARIBBEAN

UTC	MUF	dBU	FOT	14 2	18 1	21 2	24 9	28 5
1	8 4	24	6 5	2	23	.	.	.
2	9 4	14	7 2	5	12	32	. .	. .
3	13 6	12	10 2	12	5	-5	-20	-36
4	21.7	11	16 8	12	15	12	6	-2
5	28.3	8	21 8	3	12	14	12	8
6	30 9	7	23 4	-2	10	13	13	10
7	30.6	6	22 9	5	8	12	12	9
8	29 1	6	23 8	5	8	11	10	7
9	26 6	7	19 9	-2	8	10	9	4
10	23.5	8	17 7	4	11	10	6	0
11	19 7	10	14 7	9	11	8	1	-9
12	16 0	12	12 0	12	9	2	-9	-24
13	12 9	15	9 6	14	3	-8	-27	.
14	10 7	22	7 9	12	-5	-23	.	. .
15	9 3	28	6 9	8	-15	-39	.	. .
16	8 9	31	6 5	6	-20	.	.	. .
17	9 1	33	6 8	8	-18	.	. .	. .
18	9 5	34	7 0	11	-14	-38	. .	. .
19	8 9	35	6 6	7	-20	.	..	. .
20	9 1	34	6 7	9	-17	.	..	. .
21	8 5	35	6 5	4	-25	..	..	. .
22	8.4	35	6 4	3	-27	...	.	.
23	9 4	34	7.1	10	15	-39	...	..
24	8 5	34	6 5	4	23	.	.	.

VK WEST - AFRICA

UTC	MUF	dBU	FOT	14 2	18 1	21 2	24.9	28.5
1	31 4	11	24 1	5	16	18	18	15
2	30.3	13	24 5	1	14	17	17	15
3	29.1	12	23 9	-1	12	15	15	13
4	28 3	12	23 2	-2	11	14	14	12
5	28 3	12	23 5	1	11	15	15	12
6	28 5	13	23 5	1	13	16	16	13
7	29.3	12	23 2	5	16	18	17	13
8	29.1	11	22 2	12	19	20	17	12
9	27 0	13	20 8	22	24	22	17	10
10	24.3	18	18 3	39	32	25	18	5
11	21 3	19	16.5	38	28	19	7	-6
12	18 7	20	14 2	34	22	10	-5	-23
13	16 6	21	12 6	30	15	0	-19	. .
14	15 0	22	11 4	26	7	-10	-33	. .
15	14 1	23	10 7	22	2	-17	..	. .
16	13 6	23	10 4	20	-2	-22	...	...
17	13 3	23	9 9	17	-5	-27	.	.
18	12 9	25	9 8	16	-7	-30	...	.
19	11 4	24	8 8	7	-22	.	.	.
20	9 7	25	7 4	-9	.	.	.	...
21	9 3	25	7 2	-15	.	.	.	.
22	13.2	16	10 0	13	-5	-23	...	...
23	20.8	12	16 1	18	17	11	2	-9
24	27 7	11	21 5	11	18	18	15	10

VK WEST - ASIA

UTC	MUF	dBU	FOT	14 2	18 1	21 2	24 9	28.5
1	31 2	9	23 6	7	16	18	17	13
2	32.8	8	24 7	7	17	19	18	14
3	32 6	9	24.5	8	17	19	18	14
4	31.7	9	24 0	11	19	20	18	14
5	30 0	11	22.6	17	22	22	18	13
6	27.4	14	20 7	27	27	24	18	12
7	24 0	18	18.2	33	29	24	15	6
8	20 7	22	15 6	36	28	20	9	-3
9	17.7	25	13 3	34	24	13	0	-18
10	14.5	29	10 8	30	15	2	-17	-38
11	12 0	32	9 0	24	5	-12	-37	...
12	10.5	35	7 7	17	-5	-27	..	...
13	9 6	36	7 1	13	-11	-35	.	...
14	9 2	36	6 8	11	-15	.	.	...
15	9 5	36	7 1	12	-13	-37	.	.
16	10 0	35	7 4	15	-8	-31	.	.
17	9 3	36	7 1	11	-15	-38	.	.
18	9 0	38	6 9	9	-17	.	.	.
19	8 9	34	6 8	8	-18	.	.	.
20	8 8	24	6 8	6	-8	.	.	.
21	11 6	17	8 5	15	0	-14	-36	.
22	16.9	15	13 0	17	13	6	-5	-19
23	23 3	12	17 9	15	18	15	10	2
24	28 2	10	21 5	10	17	17	15	10

VK WEST - STH PACIFIC

UTC	MUF	dBU	FOT	14 2	18 1	21.2	24 9	28 5
1	26 0	5	21 5		12	-1	4	5
2	25 2	6	20 3	-30	-6	2	6	6
3	24 4	9	19 6	-17	1	7	9	8
4	23 9	13	19 1	-4	9	13	13	10
5	24.0	18	19 0	10	18	19	17	13
6	23 8	22	18 8	24	26	25	21	15
7	23 3	26	18.9	33	32	29	25	18
8	22 3	27	17 4	39	34	29	22	14
9	21 2	24	16 0	38	31	24	14	3
10	17 2	27	12 9	35	24	14	1	-14
11	13 7	30	10 3	29	14	0	-19	. .
12	11.3	33	8 4	21	2	-16	.	. .
13	9 7	28	7 2	12	-9	30	. .	. .
14	9 0	14	6 7	6	-12	-31	...	.
15	9 4	5	7 1	8	-7	-25	...	.
16	9 9	4	7 4	4	-4	-15	-33	
17	10.5	-10	7 9	1	-2	-10	-25	
18	9 8	-21	7 4	0	-2	-9	-23	.
19	8 9	.	6 8	-12	-13	-21	-36	..
20	8 8	.	6 8	-25	-23	-31	.	
21	11.9	-25	8 8	-11	-3	-4	-11	-21
22	17.7	7	13 7	-20	6	2	-2	7
23	24.4	1	18 8	-36	-11	-3	1	0
24	26 3	3	21 3		-14	-3	2	4

VK WEST - USA/CARIBBEAN

APOGEE ARTS

HAMADS

TRADE HAMADS

● AMIDON ferromagnetic cores: for LF/HF/VHF/UHF applications. Send DL size SASE for data/price to RJ & US Imports, Box 431, Kiama NSW 2533 (no enquiries at office please 14 Boanyo Ave, Kiama) Agencies at: Geoff Wood Electronics, Sydney; Webb Electronics, Albury; Assoc TV Service, Hobart; Electronic Components, ACT Truscott Electronics, Melbourne.

● PROPAGATION PREDICTIONS. Do it yourself with user friendly GRAPH-DX software. Signal strength and MUF graphs and tables on-screen. Print them, too. Runs on IBM XT/ATs etc, with EGA, VGA or Hercule screen. Demo disk $5. Fully featured version (covers 1 50MHz) $99. Limited version $39. On 5.25" 360K disk. Add $3 postage. FT Promotions, PO Box 285, Balmain NSW 2041

● ELECTRONICS E-Z CALC software, for enthusiast or professional. Calculate Rs and Cs in parallel, L-pads, attenuators, L-C-R networks and more. $49 GP FILTER. General purpose filter design. User friendly LC, active & switched-cap filters. Plots circuits on-screen. Print them too IBM XT/ATs with EGA, VGA or Hercules and hard drive On 5.25" 360K disk Add $3 postage. FT Promotions, PO Box 285 Balmain NSW 2041

● WEATHER FAX programs for IBM XT/AT's *** RADFAX2 is a high resolution shortwave weatherfax, morse & RTTy receiving program. Needs CGA, SSBrf radio & RADFAX decoder Also RF2HERC. RF2EGA and RF2VGA same as RADFAX2 but suitable for Hercules, EGA and VGA cards respectively, $35 *** SATFAx is a NOAA Meteor and GMS weather satellite picture receiving program. Uses EGA or VGA modes. Needs EGA or VGA colour monitor and card, WEATHER FAX PC card + 137 Mhz receiver, $45 *** All programs are on 5.25" OR 3.5" disks (state which) + documentation, add $3 postage. ONLY from M Delahunty, 42 Villiers St, New Farm Qld 4005. Ph. (07)3582785.

FOR SALE - A.C.T.

● ROTATOR HAM M VGC $235 VK1VP QTHR (06)2496348.

FOR SALE - N.S.W.

● KENWOOD TS-120V HF bxr vgc $425. Alinco ALX-2T lm 2metre h/h vgc $225. Rodney QTHR (049) 49 8393 or (049) 29 2933 VK2CN

● FTV650 YAESU transverter c/w all cables suit FT401 FT200 FT101B-E ETC with handbook VK2EVB Peter (066)52 7160 $110. o.n.o

● ICOM 751 HF original packing and books as new no mods $1700 Ph. (047) 35 1415 Emu Plains

● UHF SHF ceramic triodes 2C39A new in carton $20 posted Goulburn AR Society P.O. Box 350 2580 Ph (048) 21 5036.

● SHACKSELL..OUT Kenwood TS120V HF transceiver incl mobile mounting cradle $300. Kenwood TR3200, 12 channel 70 cm portable transceiver $75 Icom IC02A 2m handheld with manuals spare aerials, spare battery holders, extension mic & spkr $350. licensed amateurs only Pat Brennan VK2ABE, P.O. Box 522 Glen Innes NSW 2370. (067) 32 2700 (W) 32 2949(H).

● CHIRNSIDE duo band beam 10-15m vgc $50 David VK20C (069)48 5267 AH QTHR

● OSCILLATORS, CRO. HP multimeter, vintage slide scanner, Tektronix PA., Vectorscope, AR88, computer monitor, Little big board, printer and more July 13,14,27 & 28 only VK2ZHM QTHR

● FC965 CONVERTER for FRG 9600 gives 0.5 to 60 Mhz coverage $150 O.N.O S.N. 3021 Hustler 5 band vertical $90 O.N.O. Neville VK2QF QTHR Hargraves 2850 ph (063) 73 8624.

FOR SALE - VIC.

● MODEM 2400, 1200, 300 bps operation Everex Evercom24 for IBM PC or compatible supports CCITT V22bis V22 V21 protocols hayes compatible commands complete with manuals brand new $150 Leo VK3BSX QTHR (03) 598 3115.

● KENWOOD TS120V novice power trans $450 YAESU YO 100 monitor scope $450 Ex army transceiver C42 complete system i.e. trans, power, supply. ATU antenna all cables junction boxes & headsets. no xtal or manual $150 or exchange for 6 mtr transverter or external VFO to fit Kenwood TS520S Daryl VK3XDO ph (054) 76 2243.

● YAESU FT757GX 11, FP757HD heavy duty power supply with speaker, MD-1 desk microphone, all in immaculate condition, $1950. Roth, VK3BG. (03) 725 3550.

● YAESU 101E (sn)6H351925 Yaesu FT901D (sn) 9L100180 Kenwood TS520S (sn) 731391 Kenwood TR 7400A FM2MTR (sn) 560833 Converted CB to 10M novice band (sn) 11784 emotator 103LBX (sn) B1678 HI-Gain vert. trap 10-80 Oakerblock all vgc dec'd est. ph (053) 328314.

● KAYPRO4 280CPM computer orig cpm s/ware for word processing basic amateur radio programs Z80m/c assembler prog int300bd modem includes star printer total price $900 obo ideal for learning wordstar, machine language and experimenting with basic if studying bh (03) 890 0606 ah ph. (03) 391 6310.

● HEATH HW-2036 2m Txcvr includes matching HWA-2036-3 p/supply includes mike, manuals mounting bracket EC $150.00 Noel VK3FM QTHR (03) 700 5881

● TRANSCEIVER Yaesu FT-ONE e.c. tech/man. Seico scanner SC7000 g.c. Handheld U.H.F. as new A.T.N. 8 element log periodic 14 mtr tilt over tower Emotator rotator 1103 MXX e.c. telephone (051) 992811 offers on above items moving house.

● YAESU 270R FM 2 metre with voice synthesiser board installed and hand microphone $500, RINGO antenna and coax. cable $25 VHF Wattmeter $35. POWER SUPPLY 10 amps continuous $125 PACKET SETUP advanced electronics pakrat 232 modem. Original IBM compatible software for all modes plus fax and weather maps. Other software and instructions included $450. SWITCHING MODULE for easy manipulation of HF and VHF rigs plus necessary cables and remote speaker All original manuals All items in as new condition having only had minimum transmission. nearly all on low power. Extras inc. in price, prefer to sell as a complete unit $1100. Licensed amateurs only. VK3BZC QTHR Ph (052) 44 2577

FOR SALE - QLD.

● LINEAR Amplifier 2 1/2w.in 25w.out with r.f., vox 12volt $50 General coverage rx adaptor tunes 50Khz to30MHz in 1MHz segments using your 2 metre all mode transceiver 12 volt $150 VK4ZFO Not QTHR ph. (077) 79 4641

● SK400 FOR 3-500Z $80. 4-1000 socket $40. 3-30 Vacvar $50 Bridge 2000v 500ma $60 4-250A's $40 .001 3KV feedthroughs $5 ph VK4TL (070 54 3677

FOR SALE - W.A.

● FT-1 transceiver as new condition used by present owner from new $1400 or very near offer VK6TP QTHR (09) 299 6741

WANTED - N.S.W.

● COPY of circuit diagram for ICOM DV21 VFO for 2m pay all costs Rodney VK2CN QTHR (049) 49 8393 or (049) 29 2933.

● REINARTZ coil(s), six pin valve sockets, five pin plugs old 807 bottoms exchange valves IC4 ID4 for IP5-GT IH5-GT wanted phase shift network 2O4 or similar VK2KSD QTHR.

WANTED - VIC.

● 150W HF AM TX with modulator and psu will collect. Jim VK3BCV 13 Outtrim St. Maryborough 3465.

● YAESU 625 6m all mode analogue or digital. Also mobile bracket for Icom IC202. Contact Roger VK3 XRS ph. (051)56 8291

● TRANSVERTER FTV-107R Ant. tuner FC-107 Ext speaker SP-107P, to suit FT 107M Ph. (03) 547 0910 ah only

● MANUAL for Realistic model 20-9131 PRO-30 scanner rx original or copy will re-imburse costs. Tandy/Radio Shack/ Realistic book. From 5 watts to a thousand " original or copy Bruce Kendall VK3WL (03)741 1127 bh (03)741 7654 ah, 8 Wales Place, Werribee.3030.

WANTED - QLD

● 11C90 650 MHz prescaler for freq counter (079) 57 7058.

● CIRCUIT workshop manual AWA voltohmyst 1A56074 also Unear type unknown has EEC on circuit boards also conversion info telex 20001or TTY John Schumacher (070)91 2705 VK4DJS.

OSKERBLOCK 200 SWR meter in good order and condition only reasonable price ph (071) 25 3415 QTHR VK4ECS ask for Clarrie.

WANTED - S.A.

● HEATHKIT HW-16 HG10B HW101, DX-40: Eddystone EA12; Johnson 'Challenger', or 'Ranger II' Hammarlund HQ-110: Drake T-4X, R4A, EICO etc similar vintage CW equipment. Also 2.4m fibreglass quad spreaders, details to 'Doc' VK5HP (086)49 1958 Whyalla S.A.

● SINGER GERTSCH FM10CS signal generator modules types OAM-1, MDM-1, AFM-2. Manual for RFM10B module CRT type D7/16GJ Steve VK5ZNJ (08)255 5284 (h) (08) 238 3210 (w)

WANTED - W.A.

● INTRUDER WATCH Observers in VK6. Free tape, logs, postage and advice. Please help Contact Graham VK6RO QTHR (09)451 3561

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AR ARTICLES
PO Box 300
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Vic 3162

INTRUDER WATCH

GORDON LOVEDAY VK4KAL
FEDERAL INTRUDER WATCH CO-ORDINATOR
AVIEMORE RUBYVALE 4702

I am indebted to Col VK4AKX for the info herewith. Col has, over the past couple of months, been doing some interesting research into types of transmissions by the USSR. Some signals are heard in VK, mostly as harmonics, the fundamentals being in the VLF area of 20.5kHz. These appear to be either time signals or are possibly used as navigational aids.

Russian maritime stations use three letters as a callsign; ships use four letters; commonly heard transmitting groups of three or five figures. Outside of the maritime service, other transmissions use three letters plus a number, eg UHF3, REJ60 etc. Whilst naval and military use three letters, ie UMS, UMV, exception being UHF3! The figure 4 in non-cypher traffic has a different meaning than that used by UMS. A Russian beacon using CW can be heard on 20.992.5MHz using letter F ... audible in late evenings. An average transceiver overlaps enough to cover this frequency. Any interested observer can obtain a copy of 3rd Register Cyrillic Shifts plus ID numbers from me.

IARU Monitoring Service - April 1991

Date	Time U/TC	Frequency in MHz 'M' or 'E'	Callsign if Heard	Mode	RST	Logs X	Details of Traffic if Known Any any Other Information
300491	1220	7002	V	A1A		20	Bcn cud be navigation safety Vladivostok USR
2904	1231	7040.5		A1A			Grps figs & ltrs (A7YT 22 etc)
3004	1218	7079.8		A3E		2	B/c fmale Indian type music
0804	1212	14004		F1B			RTTY 500Hz/75 encoded
230391	0642+	14023+		F1B		30	24hr stn/250Hz 3rd register USR
0704	0950+	14032		P0N		2	"motor boat"
230391+	1210+	14048+		J3E/A0		27	Radio Tele + Tones
do	0925+	14058/62		A2?		37	24hrs stn dual transmx
270391	1200+	14070++	VRQ	A1A	599	42	ext to 14102/csigns like NPO
2303	1140+	14140.5	UMS	F1b/A1a		23	ID in CW at end fig Blks USR
290391	0905	14185.5		F1B		5	Also F7B mostly 250Hz RTTY
2303	0905	14211.5		F1B		24	250Hz QSYd to 14215 on 130491
2303	1150	14217.5		F1B		4	RTTY 250Hz also N0N
250391	0640	14217.5	UMS	F1 CW		3	F7B + fax data & pips!
2903	0750	14217.5	UMS	F1B		18	Naval Radio Moscow USR
240491	1218	18070		A3E			B/c music & talk
2303++	0120++	21032	UMS	F1B		22	USR Naval rad/also A1A
0504	0150	21032	UMS	???		3	Mode unknown + fax
0940++	0540	21032	UMS	F1B		24	Naval Radio Moscow USR
2303/29	0940+	21283.5	UMS	F1B		39	RTTY 250Hz 3rd reg as above
2303/29	1030+	21347.5		F1B		38	250Hz Wx fax + RYs
120491	0420	21445	R Moscow	F3			News in English USR
0304	0845	28515	???	A3E		9	B/c in Jap/Rus "East is Red"

Many B/c stns still being heard on the 10m band, also on 21, 14 & 28 we are hearing P0N signals much more; our new breed of "woodpecker" is OTHR.

Reports this month from VKs 2PS, 2EYI, 3AMD, 4BG, 4DD, 4AKX, 4BXC, 4BTW, 5TL, 6RO, 6XW, 6BWI and 7RH. Many thanks. ar

Hamads

Please Note: If you are advertising items For Sale and Wanted please use a separate form for each. Include all details; eg Name, Address, Telephone Number (and STD code), on both forms. Please print copy for your Hamad as clearly as possible.
*Eight lines per issue free to all WIA members, ninth line for name and address Commercial rates apply for non—members. Please enclose a mailing label from this magazine with your Hamad.
*Deceased Estates: The full Hamad will appear in AR, even if the ad is not fully radio equipment.
*Copy typed or in block letters to PO Box 300, Caulfield South, Vic 3162, by the deadline as indicated on page 1 of each issue.
*QTHR means address is correct as set out in the WIA current Call Book.

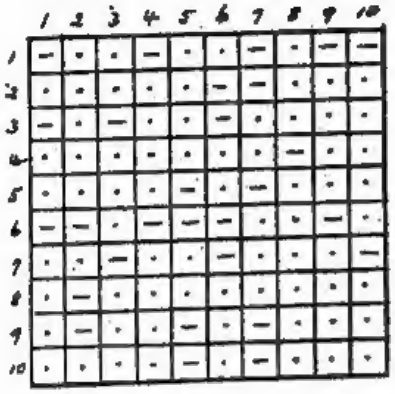
*WIA policy recommends that Hamads include the serial number of all equipment offered for sale.
*Please enclose a self addressed stamped envelope if an acknowledgement is required that the Hamad has been received.
Ordinary Hamads submitted from members who are deemed to be in general electronics retail and wholesale distributive trades should be certified as referring only to private articles not being re—sold for merchandising purposes.
Conditions for commercial advertising are as follows: $25.00 for four lines, plus $2.25 per line (or part thereof) Minimum charge — $25.00 pre—payable.

State: .....

Not for publication: ❑ Miscellaneous ❑ For Sale ❑ Wanted

Name: ..... Call Sign: ..... Address: .....

Solution to Morseword No 52



Across: 1 tidy; 2 sews; 3 case; 4 heel; 5 sale; 6 matter; 7 fast; 8 lies; 9 rents; 10 sari.
Down: 1 kites; 2 sing; 3 fib; 4 dues; 5 sweat; 6 pats; 7 grew; 8 iris; 9 base; 10 bits

TRADE PRACTICES ACT
It is impossible for us to ensure the advertisements submitted for publication comply with the Trade Practices Act 1974. Therefore advertisers and advertising agents will appreciate the absolute need for themselves to ensure that, the provisions of the Act are complied with strictly.

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All advertisers are advised that advertisements containing only a PO Box number as the address cannot be accepted without the addition of the business address of the boxholder or seller of the goods.

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PRINTING: Industrial Printing, Richmond

MAIL DISTRIBUTION: R L Polk & Co Pty Ltd, PO Box 140, Collingwood, Vic. 3066, Tel:(03) 417 5161

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Fill out the following form and send to:

The Membership Secretary
Wireless Institute of Australia
PO Box 300
Caulfield South, Vic 3162

I wish to obtain further information about the WIA.

Mr, Mrs, Miss, Ms: .....

.....

Call Sign (if applicable): .....

Address: .....

.....

.....

State and Postcode: .....

VK QSL Bureaux

The official list of VK QSL Bureaus. All are Inwards and Outwards unless otherwise stated.

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VK2	PO Box 73 Teralba NSW 2284
VK3	Inwards - GPO Box 757G Melbourne Vic 3001
	Outwards - 38 Taylor St Ashburton Vic 3147
VK4	GPO Box 638 Brisbane QLD 4001
VK5	PO Box 10092 Gouger St Adelaide SA 5000
VK6	GPO Box F319 Perth WA 6001
VK7	GPO Box 371D Hobart TAS 7001
VK8	C/o H G Andersson VK8HA
	Box 619 Humpty Doo NT 0836
VK9/VK0	C/o Neil Penfold VK6N
	2 Moss Court Kingsley WA 6062

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The following items are available from your Division's Bookshop
(see the WIA Division Directory on page 3 for the address of your Division

	Ref	Price to Members
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Ant. Compendium Vol 2 Software only	BX293	$18.00
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Antenna Compendium Vol 2 ARRL	BX292	$21.60
Antenna Handbook - Orr	BX217	$15.60
Antenna Impedance Matching - ARRL	BX257	$27.00
Antenna Note Book W1FB - ARRL	BX179	$18.00
Antenna Pattern Worksheets Pkt of 10 - ARRL	BX211	$5.40
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Transmission Line Transformers - ARRL	BX329	$36.00
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Vertical Antennas - Orr	BX220	$14.30
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Grand Canyon QSO - ARRL	BX207	$9.40
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SOS At Midnight - ARRL	BX209	$9.40
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